

Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

1.972

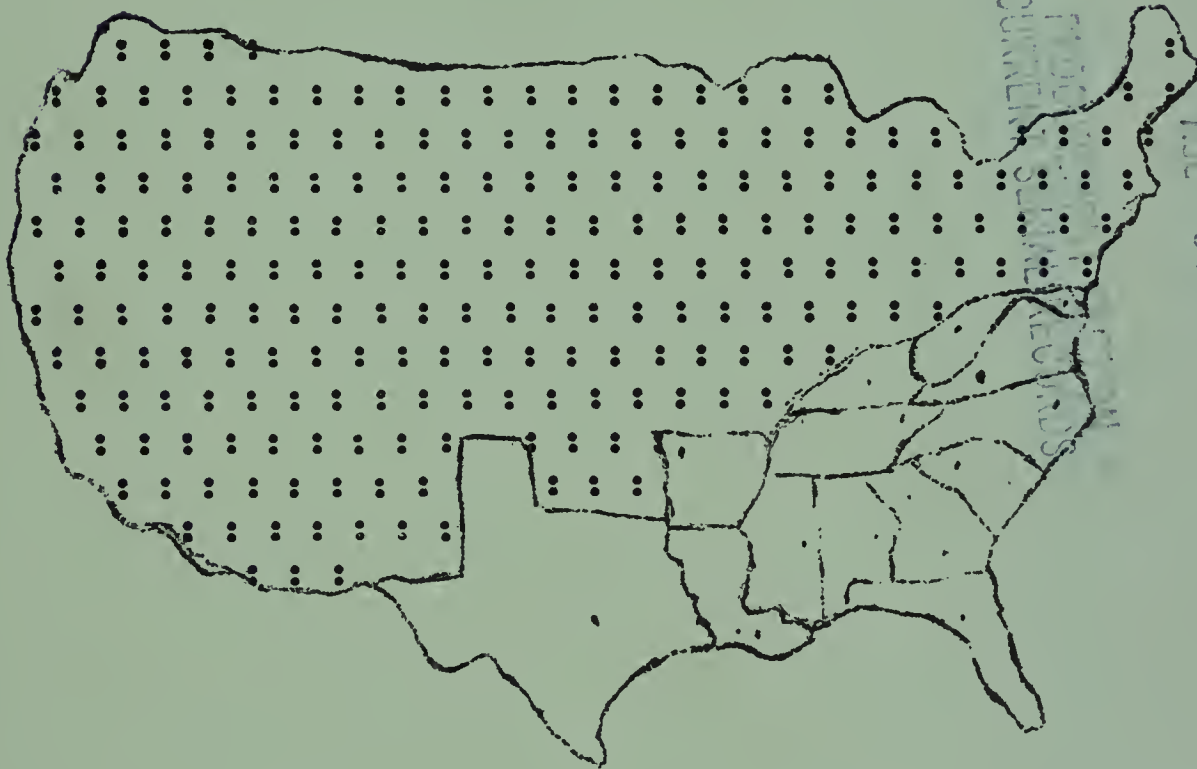
A2AN73

E. J. Wiermich

U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
ANIMAL HUSBANDRY RESEARCH DIVISION
AND
COOPERATING SOUTHERN STATES
S-10

Improvement of Beef Cattle
Through Breeding Methods

Proceedings S-10 Technical Committee Meeting
Clemson, South Carolina
July 9 - 12, 1961
and
1960 Annual Report



U.S. DEPARTMENT OF AGRICULTURE
ANIMAL HUSBANDRY RESEARCH DIVISION
CUMULATIVE RECORDS

JUL 31 1961

RECEIVED

HEADQUARTERS
205 Animal Science Building
University of Tennessee
Knoxville, Tennessee

This is a report of project leaders and the Regional Coordinator covering research projects not yet completed. It is intended for the use of administrative leaders and workers in this or related fields of research. The material is not intended for general distribution and should not be quoted in publications.

C O N T E N T S

Personnel.	1
Introduction	3
Scope and Recent Developments	3
Proceedings S-10 Technical Committee Meeting	5
Minutes S-10 Executive Committee Meeting	8
Minutes S-10 Technical Committee Meeting	9

State Reports

Alabama	16
Arkansas	30
Florida	36
Georgia	48
Kentucky	59
Louisiana	66
Maryland	102
Mississippi	109
North Carolina	122
South Carolina	125
Tennessee.	133
Texas.	152
Virginia	170
West Virginia.	200

PERSONNEL OF THE S-10 PROJECT

STATE AGRICULTURAL EXPERIMENT STATION WORKERS (Asterisk indicates Technical Committee Members for 1961)

Alabama	*T. B. Patterson, W. M. Warren Auburn, Ala.
Arkansas	Warren Gifford, *C. J. Brown Fayetteville, Ark.
Florida	*Marvin Koger, A. C. Warnick Gainesville, Fla. W. G. Kirk, F. M. Peacock Ona, Fla.
Georgia	*B. L. Southwell, W. C. McCormick Tifton, Ga. T. M. Clyburn Reidsville, Ga.
Kentucky	*Neil Bradley Lexington, Ky.
Louisiana	*R. S. Temple Baton Rouge, La. T. M. DeRouen Jeanerette, La.
Maryland	*W. W. Green, J. E. Foster College Park, Md.
Mississippi	*C. E. Lindley, J. C. Taylor, Bryan Baker State College, Miss.
North Carolina	J. H. Gregor,*E. U. Dillard, J. E. Legates, D. G. Spruill Raleigh, N. C.
South Carolina	*W. C. Godley Clemson, S. C. H. H. Pierce Summerville, S. C.
Tennessee	*C. S. Hobbs, H. J. Smith T. M. High J. W. Cole, C. B. Ramsey, R. J. Cooper B. B. Wilson Knoxville, Tenn. J. M. Bird, R. A. Reynolds Oak Ridge, Tenn. J. H. Feltz Greeneville, Tenn. J. A. Odom Crossville, Tenn. L. M. Safley Springfield, Tenn. E. J. Chapman Spring Hill, Tenn. J. McLaren Grand Junction, Tenn.
Texas	Walter E. Kruse McGregor, Tex. *T. C. Cartwright, R. E. Patterson, Sylvia Cover, G. T. King, H. O. Kunkel College Station, Tex. A. A. Melton Balmorhea, Tex. J. P. Smith, George Ellis Panhandle, Tex.
Virginia	*J. A. Gaines, G. W. Litton, R. C. Carter, T. J. Marlowe, J. S. Copenhaver Blacksburg, Va. K. P. Bovard Front Royal, Va. Roy Hammes Middleburg, Va. William McClure Steeles Tavern, Va.

U. S. DEPARTMENT OF AGRICULTURE WORKERS

E. J. Warwick, Chief, Beef Cattle Research Section Beltsville, Md.
C. M. Kincaid, Regional Coordinator, S-10 Knoxville, Tenn.
S. L. Cathcart, Supt., Iberia Livestock Expt. Station. Jeanerette, La.
W. L. Reynolds , Iberial Livestock Expt. Station Jeanerette, La.
B. M. Priode, Supt.,Beef Cattle Research Station Front Royal, Va.
W. C. Burns, Supt., West Central Fla. Expt. Sta. Brooksville, Fla.
M. J. Burris, Animal Geneticist, SESD Washington, D. C.

REGIONAL OFFICERS - 1961

R. E. Patterson, Administrative Adviser. College Station, Texas
Marvin Koger, Chariman Gainesville, Florida
W. C. Godley, Secretary Clemson, South Carolina
W. C. McCormick, Executive Committee Member Tifton, Georgia

INTRODUCTION

This project was initiated in 1948 to investigate and develop methods of breeding more productive beef cattle for the South. Detailed Annual Reports showing research developments and progress in each state have been prepared in each year since 1950. Earlier reports included material on the overall program, and will not be repeated here. A limited number of earlier reports for some years are available and may be obtained from the Regional Coordinator.

This publication includes the proceedings of the 1961 Annual Meeting of the S-10 Technical Committee and Annual Reports on projects in each of the 14 cooperating states. The Annual Reports on S-10 contributing and supporting projects were prepared by station project leaders and personnel as summaries of research developments and progress at each Station during 1960. The results are not considered as final, but the material will aid cooperators and the Coordinator in developing an integrated program. This reports also provides information needed by heads of Animal Husbandry Departments, Experiment Station Directors, and U. S. Department of Agriculture officials for evaluation of the projects with respect to objectives and procedures. This report is not for general distribution and material in it should not be quoted in publications.

SCOPE OF PROJECT AND RECENT DEVELOPMENTS

Agricultural Experiment Stations in 14 states and the Animal Husbandry Research Division of the Agricultural Research Service, U. S. Department of Agriculture had active contributing projects in the program in 1960. Experimental cattle were maintained at 38 Experiment Stations and substations in the Region. Thirty-five of these were State-owned and three Federally-owned. The latter three stations located at Jeanerette, Louisiana; Brooksville, Florida; and Front Royal, Virginia, were in each case operated cooperatively with the state in which they were located.

As of July 1, 1961 there were 13,734 head of cattle in research herds at stations in the project. This was slightly larger than the inventory a year earlier and included 6,373 cows and heifers over two years of age, 1718 yearling heifers, 4376 calves, 587 bulls and 680 steers. Post-weaning feeding and grazing tests were completed during the year with 657 young bulls, 716 heifers and 754 steers. Fewer bulls were on post-weaning tests in 1960 than 1959 due largely to a reduction in the number of young bulls fed out for cooperating breeders. See pages 13 and 14 for cattle numbers by states.

The S-10 project continued to be diversified with respect to the types and kinds of cattle in breeding herds. Over 60 different breed combinations were represented in the 1960 calf crop. Since most of these breed combinations were listed in the 1958 and 1959 Annual Reports, a tabulation of them by states in not repeated in this report. As in previous years a majority of the matings were inter se with British breeds, but Brahman, British-Brahman

derivatives, Afrikander-Angus, Sindhi and Charolais were also represented. About one-third of the calves were involved in crossbreeding experiments within and among different types of cattle. A manuscript which summarized results of crossbreeding at several stations was prepared during the year. It is expected that this will be published as a bulletin in the Southern Regional Series.

Emphasis has continued on the development of more precise methods for beef cattle improvement with respect to performance characteristics, such as: Growth rate, efficiency, cow productivity, adaptation to environmental conditions, and quality of meat. The latter characteristic continued to receive increased interest in cooperative investigations which tied together Beef Cattle Breeding and Meats Research at ten institutions.

Studies on bovine dwarfism continued at four stations in the Region. The major problem in the control of dwarfism, identification of carriers of the dwarf gene, has not been solved. Breeders have utilized research information to develop breeding methods (pedigree selection and progeny testing) to achieve some control of this abnormality have continued in breeding herds. Investigations have been continued on the X-ray technique, biochemistry of blood and tissue constituents, hormones, physiology and other phenotypic expressions of the syndrome with animals of presumed known genotypes. One promising lead relating to certain mucopolysaccharides in body fluids and certain tissues will be further studied.

INTEREST OF PUBLIC IN THE PROJECT

An increasing number of breeders are using procedures and techniques developed in this project. Recent estimates indicate that breeders across the nation with over 300,000 breeding cows are in organized performance testing programs. Gain on post-weaning feeding tests and weight for age continue to grow in importance which influence the price of bulls sold in public sales and by private treaty. The relation of sale price to performance indicates that breeders are aware of and utilizing performance records in their selection of sires.

State and local conferences for cattlemen usually feature beef cattle breeding research on their programs. Field days and sales at stations where results from this project are presented have been well attended and reflect the growing interest of cattlemen in the programs. In many cases, breeders and representatives of groups of cattlemen are consulting scientists in the project regarding breeding plans for cattle improvement. It appears that the industry is coming to depend more and more on beef cattle breeding research to develop methods and provide guide lines which will better equip the industry to meet the food needs of an increasing population.

1961 S-10 Technical Committee Meeting
Clemson College
Clemson, South Carolina

The 1961 meeting of the S-10 Technical Committee was held at Clemson College, Clemson, South Carolina, July 11 and 12, 1961 (see program for schedule of events). Dr. M. Koger, Chairman, called the meeting to order at 8:15 a.m., July 11. Dr. Godley, Technical Committee member from South Carolina, introduced Dean M. D. Farrar, Dean of Agriculture, Clemson College, who welcomed the group to the station and gave a brief summary of the importance of livestock to the agricultural economy of the Southeast. Dr. Godley introduced members of the Clemson staff present for the meeting.

The Chairman asked each Technical Committeeman to introduce himself and others from his station attending the meeting. The following representatives of the S-10 Technical Committee and their guests were present (Technical Committee members are designated by an asterick):

- * T. B. Patterson, Alabama Agr. Exp. Sta. Auburn, Alabama
- * C. J. Brown, Arkansas Agr. Exp. Sta., Fayetteville, Arkansas
- * Marvin Koger, Florida Agr. Exp. Sta., Gainesville, Florida
- J. R. Crockett, Everglades Exp. Sta., Belle Glade, Florida
- F. M. Peacock, Range Cattle Exp. Sta., Ona, Florida
- * W. C. McCormick, Georgia Coastal Plain Exp. Sta., Tifton, Georgia
- T. M. Clyburn, Georgia Coastal Plain Exp. Sta., Reidsville, Georgia
- J. L. Carmon, University of Georgia, Athen, Georgia
- W. E. Neville, Jr., Georgia Exp. Sta., Experiment, Georgia
- * N. W. Bradley, Kentucky Agr. Exp. Sta., Lexington, Kentucky
- * R. S. Temple, Louisiana Agr. Exp. Sta., Baton Rouge, Louisiana
- T. M. DeRouen, Iberia Livestock Exp. Sta., Jeanerette, Louisiana
- W. L. Reynolds, Iberia Livestock Exp. Sta., Jeanerette, Louisiana
- * W. W. Green, Maryland Agr. Exp. Sta., College Park, Maryland
- * C. E. Lindley, Mississippi Agr. Exp. Sta., State College, Mississippi
- J. C. Taylor, Mississippi Agr. Exp. Sta., State College, Mississippi
- * E. U. Dillard, North Carolina Agr. Exp. Sta., Raleigh, North Carolina
- J. E. Legates, North Carolina State College, Raleigh, North Carolina
- * W. C. Godley, South Carolina Agr. Exp. Sta., Clemson, South Carolina
- L. F. Cato, Clemson College Ext. Ser., Clemson, South Carolina
- J. E. Cox, Clemson College, Clemson, South Carolina
- R. L. Edwards, South Carolina Agr. Exp. Sta., Clemson, South Carolina
- E. G. Godbey, South Carolina Agr. Exp. Sta., Clemson, South Carolina
- Victor Hurst, South Carolina Agr. Exp. Sta., Clemson, South Carolina
- H. M. Jamison, Clemson College Ext. Ser., Clemson, South Carolina
- D. H. Kropf, South Carolina Agr. Exp. Sta., Clemson, South Carolina
- R. F. Wheeler, South Carolina Agr. Exp. Sta., Clemson, South Carolina
- R. L. Wilson, South Carolina Agr. Exp. Sta., Clemson, South Carolina
- J. F. Wise, Clemson College Ext. Ser., Clemson, South Carolina
- * C. S. Hobbs, Tennessee Agr. Exp. Sta., Knoxville, Tennessee
- R. J. Cooper, Tennessee Agr. Exp. Sta., Knoxville, Tennessee
- J. W. High, Tennessee Agr. Exp. Sta., Knoxville, Tennessee
- * T. C. Cartwright, Texas Agr. Exp. Sta., College Station, Texas

- * J. A. Gaines, Virginia Agr. Exp. Sta., Blacksburg, Virginia
- T. J. Marlowe, Virginia Agr. Exp. Sta., Blacksburg, Virginia
- * H. E. Kidder, West Virginia Agr. Exp. Sta., Morgantown, West Virginia
- Luis Rivera Brenes, Puerto Rico Agr. Exp. Sta., Rio Piedras, Puerto Rico
- W. C. Burns, AHRD, USDA, West Central Florida Expt. Sta., Brooksville, Fla.
- M. J. Burris, SESD, USDA, Washington, D. C.
- W. R. Harvey, Biometrical Service, USDA, Beltsville, Maryland
- * C. M. Kincaid, S-10 Regional Coordinator, SHRD, USDA, Knoxville, Tennessee
- B. M. Priode, AHRD, USDA, Beef Cattle Res. Sta., Front Royal, Virginia
- E. J. Warwick, AHRD, USDA, Beltsville, Maryland

The remainder of the program followed the printed schedule.

Dr. Brenes reported briefly on the beef cattle research in Puerto Rico.

Dr. Kincaid remained those who had suggestions to make on the 10-Year Progress Report or on the crossbreeding manuscript to submit them to him before July 20.

The meeting adjourned at 12:00 noon, July 12, 1961.

W. C. Godley
Secretary

Program
for
ANNUAL MEETING S-10 TECHNICAL COMMITTEE
Clemson, South Carolina
July 9-12, 1961

July 9 Holiday Inn Motel, Charleston, South Carolina

7:30 p.m. S-10 Executive Committee Meeting.

July 10 Tour of Research at South Carolina Station

8:15 a.m. Leave Holiday Inn Motel

9:00 to 10:30 a.m. Coast Experiment Station, Summerville, South Carolina

11:45 a.m. Lunch - Ziggies Restaurant, Bamberg, South Carolina

1:15 to 3:00 p.m. Edisto Experiment Station, Blackville, South Carolina.

6:00 p.m. Arrive Clemson House, Clemson, South Carolina.

July 11 Purple Room, Clemson House
Dr. Marvin Koger, Chairman, presiding

8:15 a.m. Welcome by Dr. M. D. Farrar, Dean of Agriculture, Clemson College

8:30 a.m. Introductions, committee assignments, etc.

8:40 a.m. to 12:00 noon Station reports from Alabama; Arkansas; Florida; Brooksville, Fla.; Georgia and Kentucky

12:00 noon Lunch

1:00 to 3:00 p.m. Station reports from Louisiana; Jeanerette, La.; Maryland and Mississippi.

3:00 to 5:00 p.m. Tour of research at Clemson.

6:00 p.m. Group dinner and business meeting.

July 12 Purple Room, Clemson House
Dr. Marvin Koger, Chairman, presiding

8:00 to 11:45 a.m. Station reports from North Carolina; South Carolina; Tennessee; Texas; Virginia; Front Royal, Virginia and West Virginia.

11:45 a.m. S-10 Progress Report and publication on Crossbreeding

12:15 p.m. Adjourn

MINUTES

MEETING OF EXECUTIVE COMMITTEE S-10, SOUTHERN REGIONAL BEEF CATTLE BREEDING PROJECT

A meeting of the Executive Committee of the S-10 Regional Project was held at the Holiday Inn Hotel, Charleston, South Carolina on July 9, 1961. M. Koger, Chairman, called the meeting to order at 7:45 p.m. Present for the executive session were: M. J. Burris, T. C. Cartwright, W. C. Godley, C. M. Kincaid, M. Koger, W. C. McCormick and E. J. Warwick. Dr. Cartwright attended the meeting at the invitation of Chairman Koger to represent Dr. R. E. Patterson, Administrative Adviser, who could not be present.

Dr. Koger asked W. C. Godley to outline the program for July 10. The program for the following day was to consist of a tour of the Coast Experiment Station, Summerville, South Carolina, then to proceed to Bamberg, South Carolina for lunch. After lunch the group was to visit the Edisto Experiment Station at Blackville, South Carolina, and continue to Clemson where the meetings were scheduled for July 11.

The Chairman asked for recommendations about appointment of new committees. He commented that the committee on data collection, with Dr. J. A. Gaines as Chairman, and the committee on carcass and beef standardization, with Dr. C. S. Hobbs as Chairman, would report at this meeting.

The 10-year Progress Report, prepared by Dr. Kincaid, was discussed, and it was decided that the Executive Committee would recommend to the Technical Committee that they make any suggestions about this report at the meeting during the time scheduled, beginning at 11:45 July 12.

The manuscript entitled, "Breed Crosses with Beef Cattle in the Southern Region ", was discussed in some detail. It was pointed out that the Administrative Adviser is the channel for publication of regional publications. The Executive Committee should approve the manuscript and then submit it to the Administrative Adviser. The decision was that the Executive Committee recommend to the Technical Committee that the manuscript be submitted to Dr. R. E. Patterson, Administrative Adviser for S-10, and suggest it be published in the Regional Series by the state of Texas, if agreeable with that station. It was further agreed by the Executive Committee that C. M. Kincaid be the senior author and that in the beginning of the manuscript, perhaps on the inside of the flyleaf, the collaborating personnel by states be listed. Dr. Cartwright suggested that a statement be included in the letter of transmittal to Dr. Patterson to the effect that the Technical Committee had an opportunity to review the manuscript and approves it for publication. Dr. McCormick suggested that the stations that contributed data to this publication review critically the manuscript, especially that portion that includes information from their station. He further suggested that July 20 be set as a deadline for suggestions to reach Dr. Kincaid. Approval was to be assumed if Dr. Kincaid did not receive comments by July 20. The Executive Committee agreed to recommend the suggestions of Drs. Cartwright and McCormick to the Technical Committee.

Dr. Burris mentioned the two bills presently in Congress concerning humane treatment of animals used for research. After some discussion, it was agreed that the Technical Committee should insure that the directors of their respective stations be informed of the consequences should these bills become law.

Dr. McCormick asked for recommendations about passing out to the Technical Committee copies of the project statement that he had submitted to Dr. Kincaid for approval as a contributing project to S-10. It was agreed that the Technical Committeemen should receive copies of this project statement.

The Secretary asked for comments about the program for the Annual Meeting for next year. Several suggestions were made and the Executive Committee decided to recommend to the Technical Committee that the program for next year would emphasize the information that has been uncovered -- What will be the problems for the future and how are we going to solve them?

The meeting adjourned at 10:50.

W. C. Godley
Secretary

* * * * *

MINUTES

Technical Committee Business Meeting
S-10 Southern Regional Beef Cattle Breeding Project
Clemson, South Carolina - July 11, 1961

The meeting was called to order by the Chairman of the Technical Committee, Dr. M. Koger. Technical Committee members present were as follows: T. B. Patterson, Alabama; C. J. Brown, Arkansas; Marvin Koger, Florida; W. C. McCormick, Georgia; N. W. Bradley, Kentucky; R. S. Temple, Louisiana; C. E. Lindley, Mississippi; E. U. Dillard, North Carolina; W. C. Godley, South Carolina; C. S. Hobbs, Tennessee; T. C. Cartwright, Texas; J. A. Gaines, Virginia; H. E. Kidder, West Virginia; and C. M. Kincaid, AHRD, AIS, USDA, Knoxville, Tennessee. The minutes of the Executive Committee meeting, which was held on July 9, were read. The Chairman called for discussion of or action on the recommendations made by the Executive Committee. The Executive Committee recommended to the Technical Committee that the manuscript on crossbreeding be submitted to Dr. R. E. Patterson, Administrative Adviser, S-10, and suggest it be published in the Regional Series by the state of Texas, if agreeable with that station. After discussion, Dr. E. U. Dillard moved that the recommendation of the Executive Committee be approved. The motion was seconded by R. S. Temple. The motion was carried.

The recommendations of the Executive Committee about the program for next year were discussed. After pertinent suggestions by Dillard, Patterson, Temple and Hobbs, T. C. Cartwright moved that the program be determined by

the Executive Committee. The motion was seconded by C. S. Hobbs and carried.

In his remarks, Dr. E. J. Warwick pointed out that there were no new funds for the beef cattle research branch, that the budget was getting rough for agriculture in general and for livestock in particular. He cited cases where some states had received a considerable reduction in their agricultural budgets. He discussed briefly the semen storage bank. He pointed out that Mr. Charlie Bell's recent survey showed in excess of 300,000 cows now on performance testing programs. Dr. Warwick commented on Dr. Kincaid's leaving the position of Regional Coordinator, and expressed his appreciation for the fine contribution that he had made to this group. He stated that no new successor had been appointed at this time, but he hoped to name a new coordinator very shortly.

Dr. Koger recognized two new Technical Committee members. C. J. Brown replaced Warren Gifford for the state of Arkansas, and E. U. Dillard replaced J. H. Gregory for the state of North Carolina.

Dr. M. J. Burris, representing the State Experiment Stations Division, commented briefly on the contributing projects to S-10. He pointed out the necessity of keeping all projects current and elimination of duplication.

The Regional Coordinator passed out forms showing the inventory of cattle as of July 1, 1961 and allocations to state contributing projects of federal funds from RRF and AHRD and stated that they were incomplete. He asked that necessary information be given to him as soon as possible. (A copy of each form with completed information is attached.) He asked the Technical Committee for an expression as to whether they wanted to include summary statements prepared for this meeting in the annual report or in the report of the meeting. It was agreed to omit the summary statements from both reports. Dr. Kincaid asked for suggestions on the 10-Year Progress Report. Dr. Warwick suggested that the report, with some modification, could possibly be published later in the form of a bulletin. R. S. Temple, in reference to Dr. Warwick's suggestion, suggested that it be in the form of a state bulletin. C. S. Hobbs recommended that the report be presented to a limited few and that the Executive Committee, along with the new coordinator, and Dr. Warwick, consider further publication of this report. R. S. Temple moved that the report be sent to Technical Committeemen in S-10, NC-1, and W-1 and to heads of departments in the southern region, in addition to the directors. This motion was seconded by Hobbs and carried.

The committee's report on carcass and beef standardization was presented by C. S. Hobbs, Chairman of the committee. This committee recommended that each state submit its procedure for collecting carcass data in detail to the committee. These reports would be studied by the committee in an attempt to standardize as much as possible without attempting to change what anyone is doing. Dr. Hobbs passed out a sheet used at the University of Tennessee, (see attached sheet) which could be used as a guide for each state in preparing the report. Hobbs moved the acceptance of this report and Godley seconded. The motion carried.

Dr. J. A. Gaines, Chairman of the committee on data analysis and processing, reported that no one asked for help from his committee during the past year. He stated that the committee would still be quite willing to assist any of the Technical Committeemen in analysis of data.

The report of the Resolution Committee was as follows:

"Be it resolved that the S-10 Technical Committee express their appreciation to Dr. C. M. Kincaid for his contribution as both a committee member and the Coordinator.

Furthermore, since "Dr. Charlie's" service has been outstanding in adding both practicality and intellectual rigor to S-10 research and since his philosophical attitude and ubiquitous wit have contributed efficiency and congeniality to the group, it is in order for all present to demonstrate approval of this resolution in a standing ovation.

Be it further resolved that the committee express their appreciation to Dr. Warren Gifford, an original Technical Committeeman, for his outstanding service and inspiration and to J. H. Gregory for his conscientious fulfillment of an interim committee position.

Be it further resolved that appreciation be expressed to Dr. W. C. Godley for collecting and binding the S-10 Contributing Projects and for his excellent planning of arrangements and tours, and to Dr. R. F. Wheeler and his Animal Husbandry Departmental Staff, Dr. Harold Pierce and his staff, Mr. W. B. Rogers and his staff for their hospitality and courtesies."

T. B. Patterson
C. J. Brown
T. C. Cartwright, Chairman

After the standing ovation, Dr. Kincaid was presented with a watch as a token of appreciation for his service as a Technical Committeeman and as Regional Coordinator.

T. C. Cartwright moved the acceptance of the report of the Resolution Committee. The motion was seconded by C. S. Hobbs and passed.

An invitation to the Technical Committee was given by T. B. Patterson to hold next year's Annual Meeting at Auburn University, Auburn, Alabama. Dr. Hobbs moved that the invitation be accepted. The motion was seconded by C. E. Lindley and was carried.

Dr. T. B. Patterson was elected to the Executive Committee. The Executive Committee for next year will be: W. C. Godley, Chariman; W. C. McCormick, Secretary; and T. B. Patterson, Member.

The meeting adjourned at 9:30 p.m.

W. C. Godley
Secretary

University of Tennessee
Agricultural Experiment Station
Animal Husbandry-Veterinary Science Department

Standard Procedure for Obtaining Carcass Data for Breeding and Feeding Experiments

1. Pre-shipment handling:

- a. Weigh two consecutive days just prior to slaughter.
- b. Feed normal ration night before slaughter; no feed morning of slaughter
- c. No water after 9 p.m. day before slaughter.

2. At slaughter time:

- a. Take individual weights as cattle arrive at slaughter house (sale weight).
- b. Identify carcass with manila tag just before carcass goes on the rail.
- c. Obtain hot carcass weight as carcass goes over scales.

$$\text{Dressing percent} = \frac{\text{Hot carcass wt.} - 2\frac{1}{2}\% \text{ shrink}}{\text{sale weight}}$$

3. Chilled carcass:

- a. Carcass should be chilled preferably 48 hrs., but at least 24 hrs., before being ribbed between last 2 ribs. Anatomically, this is 7 1/2 vertabrae "down" from the lumbo-sacral joint.
- b. Carcass length should be measured from anterior edge of the first rib to the anterior edge of the H-bone.
- c. U.S.D.A. grades to nearest 1/3, based on ribbed carcass.
- d. Subjective marbling score by U.S.D.A. grader.
- e. Rib-eye tracing with fat and bone structure, (left side or open side).
- f. Obtain 12th or 13th rib section, 2" thick, from left side of carcass.
- g. Estimate percent kidney fat.

Each sample should be tagged with the following information:

Animal number, station, experiment and slaughter data.
Samples should be returned to Knoxville on bus or by car as soon as possible, so that they may be frozen on the 5th or 6th day after slaughter. Samples should be placed in individual plastic bags and packed in a cardboard box with dry-ice for shipment.

Additional information that can be obtained from above data:

1. Est. total lean and fat (by subt.-total bone)
2. Est. of closely trimmed, boneless retail cuts from chuck, round, rib and loin (U.S.D.A. dual grading tech.)
3. Measure of tenderness and cooking losses.

CATTLE INVENTORY AND PERCENT USE IN S-10 PROJECTS

July 1, 1961

STATE	Cows 2 yrs. & over	Yearling Heifers	Calves Under 12 mos.	Bulls over 12 mos.	Steers over 12 mos.	Total Number	Used in Project
Alabama	296	57	214	25	16	608	100%
Arkansas	312	107	243	39	0	701	100%
Florida	320	85	176	16	61	658	79%
Georgia	629	126	526	38	60	1379	100%
Kentucky	40	0	38	1	0	79	100%
Louisiana	426	74	235	17	29	781	100%
Mississippi	721	135	568	31	84	1539	53%
N. Carolina	248	65	152	19	49	533	83%
S. Carolina	198	42	146	11	0	397	51%
Tennessee	1264	459	823	179	275	3000	80%
Texas	626	135	465	50	0	1276	94%
Virginia	112	136	94	6	46	394	100%
W. Virginia	187	24	174	16	59	460	18%
FEDERAL-STATE COOPERATIVE STATIONS							
Brooksville Florida	297	71	174	44	0	586	100%
Jeanerette Louisiana	273	121	180	46	0	620	100%
Front Royal Virginia	424	81	168	49	1	723	100%
Totals	6373	1718	4376	587	680	13,734	

NUMBER OF ANIMALS ON FEEDING AND GRAZING TESTS

1960 - 1961

STATE	Bulls			Heifers			Steers			Totals			All Sexes
	Sta	: Coop	:	Sta	: Coop	:	Sta	: Coop	:	Bulls	Heifers	Steers	
Alabama	33	: 39	:	53	: 0	:	29	: 0	:	72	53	29	154
Arkansas	72	: 18	:	108	: 0	:	0	: 0	:	90	108	0	198
Florida	0	: 0	:	0	: 0	:	62	: 0	:	0	0	62	62
Georgia	58	: 89	:	41	: 0	:	36	: 24	:	147	41	60	248
Kentucky	0	: 0	:	19	: 0	:	15	: 0	:	0	19	15	34
Louisiana	0	: 0	:	0	: 0	:	65	: 0	:	0	0	65	65
Mississippi	0	: 71	:	0	: 0	:	60	: 0	:	71	0	60	131
N. Carolina	18	: 0	:	47	: 0	:	36	: 0	:	18	47	36	101
S. Carolina	5	: 0	:	0	: 0	:	54	: 0	:	5	0	54	59
Tennessee	66	: 0	:	0	: 0	:	0	: 0	:	66	0	0	66
Texas	15	: 58	:	162	: 0	:	125	: 0	:	73	162	125	360
Virginia	0	: 0	:	55	: 0	:	48	: 0	:	0	55	48	103
FEDERAL-STATE COOPERATIVE STATIONS													
Brooksville Florida	45	: 0	:	59	: 0	:	48	: 0	:	45	59	48	152
Jeanerette Louisiana	20	: 0	:	96	: 0	:	119	: 0	:	20	96	119	235
Front Royal Virginia	50	: 0	:	76	: 0	:	33	: 0	:	50	76	33	159
Totals	382	: 275	:	716	: 0	:	730	: 24	:	657	716	754	2127

REGIONAL RESEARCH AND ANIMAL HUSBANDRY RESEARCH DIVISION
FUNDS ALLOCATED TO S-10 STATE PROJECTS
FISCAL 1961 AND 1962

	R.R.F. Funds ⁽¹⁾		A.H.R.D. Funds ⁽²⁾	
	1961	1962	1961	1962
Alabama	19,842	19,830	2,400	2,400
Arkansas	11,000	11,000	3,000	3,000
Florida	8,700	8,700	2,500	2,500
Georgia	5,500	5,500	3,640	4,980
Kentucky	9,300	9,300		
Louisiana	6,000	6,000		
Maryland				
Mississippi	8,000	8,000	2,400	2,400
North Carolina	8,350	9,350	1,800	1,800
South Carolina				
Tennessee	10,000	12,000	11,400	11,400
Texas	10,000	10,000	8,400	8,400
Virginia	6,000	9,500	6,100	6,100
West Virginia				
Totals	103,692	109,180	41,640	42,980

(1) Allocated by Directors of State Agricultural Experiment Stations.

(2) Allocated through S-10 Regional Coordinator's office .

Alabama Station Summary

by

Troy B. Patterson

I. PROJECT: Animal Husbandry and Nutrition 525 (S-10) Coop. ARS

The Improvement of the Beef Cattle of Alabama Through Breeding Methods

II. OBJECTIVES:

- (1) To determine the effectiveness of mass selection for total performance in beef cattle.
- (2) To develop criteria for evaluating and selecting breeding animals.
- (3) To study the influence of heterosis in crosses between the three British breeds of beef cattle.

III. PERSONNEL:

Animal Husbandry and Nutrition Department, Auburn University, Auburn, Alabama: Troy B. Patterson, Associate Animal Breeder; George B. Meadows, Assistant Animal Husbandman; W. M. Warren, Head. C. M. Kincaid, USDA, ARS, University of Tennessee, Knoxville, Tennessee.

IV. ACCOMPLISHMENTS:

1. Scope and nature of work:

Facilities have been developed for group feeding 150 bulls, 150 heifers and 100 steers on post-weaning performance test. Additional facilities for group feeding sire progeny groups are available to handle 40 calves. Feed processing equipment is available to handle each of these groups.

A total of 239 brood cows and replacement heifers and 20 herd bulls are used on various phases of the project. Of the above females 110 (53 Angus, 50 Hereford and 7 Shorthorn) are used on the pure-bred selection phase. The remaining 128 head of which 33 are Angus, 35 are Hereford, 31 are Shorthorn and 30 are crossbreds are used on the crossbreeding phase. The 20 bulls are made up of 8 Angus, 8 Hereford and 4 Shorthorn.

In addition to the above 120 Grade cows of predominately Hereford breeding located on two Substations are used to support, in part, the research at the main station.

2. Research results:

Two year average of slaughter data from the crossbreeding phase indicate an advantage to the crossbreds in most cases with the exception of ribeye area per cwt. of carcass. However, this difference is probably due to differences in size and finish between breeds which in turn reduces the relative size of the rib eye.

These data are listed below:

Steer Data

Breed	No. of Steers	Average Daily Gain on Feed (224 days)	Chilled Carcass Weight	Federal Grade	Rib eye/cwt. carcass:
Angus	7	1.62	529	12.3	2.09
Hereford	9	1.70	482	10.2	2.23
Shorthorn	10	1.89	513	11.0	2.28
Angus x Hereford	6	1.75	528	11.4	1.95
Angus x Shorthorn	8	1.81	555	13.3	1.99
Hereford x Shorthorn	9	1.86	588	12.5	1.95

Heifer Data

Breed	No. of Heifers	Av. Adjusted Weaned wt.	Average daily gain on test	Conf. Score
Angus	10	490	1.55	12.3
Hereford	8	508	1.61	12.0
Shorthorn	1	490	1.72	14.0
Angus x Hereford	9	497	1.60	11.4
Angus x Shorthorn	8	504	1.53	11.7
Hereford x Shorthorn	7	526	1.40	12.1

Offspring from high weaning weight sires out performed offspring from low weaning weight sires. When tested on random groups of common cows. These data are shown below:

Breed	Parent Weaning Weight			Offspring Weaning Weight		
	High	Low	Difference	High	Low	Difference
Angus	555	530	25	521	514	7
Hereford	595	495	100	550	517	33
Average	575	513	62	535	516	19

V. FUTURE PLANS:

Continue in each phase now under way. Place additional emphasis on milk production research. Start complete carcass evaluation on all steers produced on all phases.

VI. PUBLICATIONS PLANNED:

Journal Paper "The Relationship of Calf Weight with Milk Production, Butter Fat, Total Solids, and Protein Content as Measured During the Lactation Period in Beef Cattle".

Highlights (Alabama Experiment Station Publication)

"The Progeny of Performance Tested Sires Compared to Sires Purchased From Non-Testing Breeders.

* * * * *

Black Belt Substation

by

Troy B. Patterson

I. PROJECT: 525-1

A Comparison of Crossbreeding and Within Breed Selection on Beef Cattle Production in the Black Belt Area of Alabama.

II. OBJECTIVES:

- (1) To evaluate the significance of hybrid vigor in various crosses of beef cattle with regard to production of slaughter calves, stocker or feeder steers and slaughter steers.
- (2) To determine the effect of heterosis on mothering ability, adaptability and fertility.
- (3) To determine the most economical method of finishing steer calves that are dropped in the spring from the above system.

III. PERSONNEL:

Troy B. Patterson, Associate Animal Breeder, Animal Husbandry and Nutrition Department, Auburn University, Auburn, Alabama; Aubrey Smith, Superintendent and Harold Grimes, Assistant Superintendent, Black Belt Substation, Marion Junction, Alabama

IV. ACCOMPLISHMENTS:

1. Scope and nature of work:

Sixty brood cows of which 20 are 1st cross Brahman x Herefords and 40 are high grade Herefords has been devoted to the first phase of this test. One half of the 40 Herefords have been bred each year to an Angus bull; the remaining cows have been bred to two Hereford bulls. This first phase will be complete with the present calf crop. Random selected heifer calves have been selected from the above matings to conduct the second phase which will include the following matings: Hereford bulls x 3/4 Hereford 1/4 Brahman cows, Hereford bulls x Hereford cows, Hereford bulls x 1/2 Hereford 1/2 Angus cows and Angus bulls x 1/2 Hereford 1/2 Angus cows. This phase will be started with the next breeding season.

2. Research Results:

A four-year summary of the first phase for gain from birth to weaning is given below:

Year	Average Daily Gain by Breed of Calf				
	3/4 Hereford	1/4 Brahman	1/2 Angus	1/2 Hereford	Hereford
1956-57	(14) ⁽¹⁾	2.00	(16)	2.09	(19) 1.91
1957-58	(16)	1.83	(14)	1.95	(18) 1.98
1958-59	(19)	1.91	(13)	1.94	(16) 1.91
1959-60	(18)	1.80	(13)	1.80	(11) 1.94
Average	(67)	1.88	(57)	1.92	(65) 1.94

(1) No. of calves weaned.

The above are corrected for age of dam, age of calf and sex (steer equivalent)

V. FUTURE PLANS:

Carry out the second phase and include some post-weaning information and carcass evaluation.

VI. PUBLICATIONS : None

VII. PUBLICATIONS PLANNED:

Station progress report covering the first 5 years when complete.

PERFORMANCE OF COW HERDS. 1960 CALVES

Alabama Station

Location Line or group Breed of sire Breed of dam	Purebred Angus		Purebred Hereford		Auburn		Purebred Shorthorn		Crossbreeding Angus		Hereford		Shorthorn	
	Purebred Angus		Purebred Hereford		Auburn		Purebred Shorthorn		Crossbreeding Angus		Hereford		Shorthorn	
No. cows calving	34		40		7		7		11		9		7	
No. calves raised	34		38		6		6		11		8		6	
Av. inbr. of calves (%)	0.11		0		0		0		0		0		0	
Av. birth date	11/10/59		11/30/59		11/26/59		11/26/59		12/7/59		12/9/59		11/14/59	
Av. birth wt. (lbs.)	58.8		68.5		64.5		64.5		63.3		70.2		62.8	
Av. weaning age	250		250		250		250		250		250		250	
Av. weaning wt.	503		475		467		467		486		493		459	
Av. weaning type score	11.9		11.2		11.3		11.3		12.8		11.6		11.7	
Av. weaning condition score	9.8		9.5		9.7		9.7		10.9		10.4		10.5	
Were calves creep fed?	No		No		No		No		No		No		No	
Adjusted(1) av. daily gain from birth to weaning	1.78		1.63		1.61		1.61		1.69		1.69		1.58	

(1) Adjusted for age of dam, age of calf, sex of calf (to steer equivalent).

PERFORMANCE OF COW HERDS. 1960 CALVES

Alabama Station

Location Line or group Breed of sire Breed of dam	Angus Hereford	Angus Shorthorn	Auburn Crossbreeding Hereford Angus	Hereford Shorthorn	Shorthorn Angus	Shorthorn Hereford
No. cows calving	2	5	6	2	5	6
No. calves raised	2	5	5	2	5	6
Av. birth date	12/12/59	11/25/59	11/14/59	11/20/59	11/28/59	11/21/59
Av. birth wt. (lbs.)	67.5	64.2	64.0	88.0	64.4	66.7
Av. weaning age	250	250	250	250	250	250
Av. weaning wt.	506	461	505	548	495	465
Av. weaning type score	11.0	10.4	12.0	11.0	11.4	11.0
Av. weaning condition score	10.0	9.4	10.6	10.0	10.6	9.8
Were calves creep fed?	No	No	No	No	No	No
Adjusted ⁽¹⁾ av. daily gain from Birth to weaning	1.75	1.59	1.76	1.84	1.72	1.59

(1) Adjusted for age of dam, age of calf, sex of calf (to steer equivalent).

PERFORMANCE OF COW HERDS. 1960 CALVES

Alabama Station

Location Breed of sire Breed of dam	Hereford Hereford	Hereford 1/2 Angus 1/2 Hereford	Black Belt Hereford 3/4 Hereford 1/4 Brahman	Substation Angus Hereford	Angus 1/2 Angus 1/2 Hereford	Angus 3/4 Hereford 1/4 Brahman
No. cows calving	3	6	4	6	4	6
No. calves raised	3	6	4	6	3	6
Av. birth date	10/4/59	9/16/59	9/21/59	10/13/59	9/36/59	10/28/59
Av. birth wt. (lbs.)	65	57	61	57	53	53
Av. weaning age	255	255	255	255	255	255
Av. weaning wt.	387	406	407	411	459	464
Av. weaning condition score	7.3	8.5	8.1	8.0	8.3	7.1
Were calves creep fed?	No	No	No	No	No	No
Adjusted(1) av. daily gain from birth to weaning	1.26	1.37	1.36	1.39	1.51	1.61

1
2
1

ALA (?)

(1) Adjusted for age of dam, age of calf, sex of calf (to steer equivalent).

PERFORMANCE OF COW HERDS. 1960 CALVES

Alabama Station

Location Line or group Breed of sire Breed of dam	Angus Hereford	Black Crossbreeding Hereford Hereford	Substation Hereford 1/2 Brahman 1/2 Hereford	Upper Coastal Angus Common	Plain Substation Hereford Common
No. cows calving	13	11	20	24	26
No. calves raised	13	11	18	24	25
Av. birth date	10/9/59	1/28/59	10/26/59	9/29/59	10/11/59
Av. birth wt. (lbs.)	58	64	64	58.0	61.2
Av. weaning age	255	255	255	300	300
Av. weaning wt.	517	559	522	518	511
Av. weaning type score	-	-	-	9.7	10.1
Av. weaning condition score	9.2	8.6	9.1	8.2	8.7
Were calves creep fed?	No	No	No	No	No
Adjusted av. daily gain from birth to weaning	1.80 ⁽¹⁾	1.94 ⁽¹⁾	1.80 ⁽¹⁾	1.53 ⁽²⁾	1.50 ⁽²⁾

ALA (8)

(1) Adjusted for age of dam, age of calf, sex of calf (to steer equivalent).
(2) Adjusted for age of dam, age of calf, sex of calf.

POSTWEANING PERFORMANCE OF CALVES VORN IN 1959 AND FULL FED AFTER
WEANING (or pastured for high gain)

Alabama Station

Location	Auburn				
Line or group	Purebred	Purebred	Purebred	Crossbreds	Crossbreds
Breed of sire	Angus	Hereford	Shorthorn	Angus	Hereford
Breed of dam	Angus	Hereford	Shorthorn	Angus	Hereford
BULLS, No	12	15	2		
Av. initial age (days)	369	355	336		
Av. initial wt. (lbs.)	822	794	676		
Av. no. days on feed	140	140	140		
Av. final weight	1124	1130	974		
Av. daily gain	2.16	2.40	2.13		
Av. score					
Conformation	12.7	12.8	12.9		
Feeding regime	- - - - Group Fed - - - -				
STEERS, No.				6	3
Av. initial age (days)				309	317
Av. initial wt. (lbs.)				543	532
Av. no. days on feed				209	209
Av. final weight				932	960
Av. daily gain				1.86	2.05
Av. score					
Conformation				12.8	13.0
Feeding regime				- - Group Fed - -	
HEIFERS, No.	15	15	3	5	5
Av. inbreeding (%)	0.11%	0	0	0	0
Av. initial age (days)	348	334	349	326	314
Av. initial wt. (lbs.)	501	515	533	492	509
Av. no. days on feed	131	131	131	131	131
Av. final weight	714	749	741	706	741
Av. daily gain	1.62	1.79	1.59	1.63	1.77
Av. score					
Conformation	11.5	12.3	13.0	13.4	12.0
Feeding regime	- - - - Group Fed - - - -				

Bull and steer ration consisted of 60% concentrates and 40% roughage.
Heifer ration consisted of 40% concentrates and 60% roughage. See
attached sheet for detailed ration.

ALA (10)

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
(or pastured for high gains)

Alabama Station

Location	- - - -	- - - -	- Auburn	- - - -	- - - -
Line or group	- - - -	- - - -	- Crossbreds	- - - -	- - - -
Breed of sire	Shorthorn	Angus	Angus	Hereford	Hereford
Breed of dam	Shorthorn	Hereford	Shorthorn	Angus	Shorthorn
STEERS, No.	4	2	2	2	2
Av. initial age (days)	349	311	324	361	333
Av. initial wt. (lbs.)	540	526	482	651	611
Av. no. days on feed	209	209	209	209	209
Av. final weight	918	998	958	1075	1075
Av. daily gain	1.81	2.25	2.27	2.03	2.22
Av. score					
Condition	13.0	14.0	13.5	13.0	13.5
Feeding regime	- - - -	- - - -	Group Fed	- - - -	- - - -
HEIFERS, No.	1		3	3	
Av. initial age (days)	373		332	325	
Av. initial wt. (lbs.)	517		497	534	
Av. no. days on feed	131		131	131	
Av. final weight	730		725	734	
Av. daily gain	1.62		1.74	1.53	
Av. score					
Conformation	14.0		12.0	11.3	
Feeding regime	- - - -	- - - -	Group Fed	- - - -	- - - -

Bull and steer ration consisted of 60% concentrates and 40% roughage.
Heifer ration consisted of 40% concentrates and 60% roughage. See
attached sheet for detailed ration.

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
(or pastured for high gains)

Alabama Station

Location	Auburn	Auburn
Line or group	Crossbreds	Crossbreds
Breed of sire	Shorthorn	Shorthorn
Breed of dam	Angus	Hereford
<hr/>		
STEERS, No.	4	4
Av. initial age (days)	335	331
Av. initial wt. (lbs.)	589	559
Av. no. days on feed	209	209
Av. final weight	976	1019
Av. daily gain	1.85	2.20
Av. score		
Condition	12.6	13.2
Feeding regime	- - - - - Group Fed - - -	
<hr/>		
HEIFERS, No.	1	2
Av. initial age (days)	286	334
Av. initial wt. (lbs.)	540	500
Av. no. days on feed	131	131
Av. final weight	742	688
Av. daily gain	1.54	1.44
Av. score		
Conformation	12.0	13.0
Feeding regime	- - - - - Group Fed - - - - -	

BULL AND STEER RATION:

Ground snapped corn	47%
Molasses	12%
Soybean meal (50%)	10%
Alfalfa meal (18%)	10%
Cottonseed Hulls	15%
Johnsongrass hay	5%
Salt	1%

HEIFER RATION:

Ground snapped corn	30%
Molasses	8%
Soybean Meal	8%
Alfalfa Meal	4%
Cottonseed Hulls	49%
Salt	1%

The above rations are blended and full fed in a self feeder.

PERFORMANCE DATA ON YEARLING OR OLDER CATTLE NOT IN BREEDING
HERDS IN 1959

Location	Auburn	Auburn
Line or group	Purebreds	Purebreds
Breed of sire	Angus	Hereford
Breed of dam	Angus	Hereford
Sex	Steers	Steers
Number	9	6
Initial Feed Lot		
Age (days)	544	518
Weight (lbs.)	740	670
First period		
Feeding regime	- - Pasture and - - - -	
No. days	Winter Roughage	
Gain per head	- - - No Record - - - -	
Gain per day		
Second period		
Feeding regime	- - - Feed Lot - - - - -	
No. days	163	163
Gain per head	283	338
Gain per day	1.74	2.07
Final		
Age	707	681
Weight	1023	1008
Score		
Condition	13.6	12.2

DATA ON ANIMALS SLAUGHTERED

Alabama Station

Location Herd	Auburn - - - -	Auburn - - - Crossbreeding - - -	Auburn - - - -	Auburn - - - -
Breed of sire	Angus	Hereford	Shorthorn	Angus
Breed of dam	Angus	Hereford	Shorthorn	Shorthorn
Sex	Steer	Steer	Steer	Steer
No. slaughtered	4	4	3	1
Age at slaughter	564	561	614	615
Time in feedlot (days)	249	249	249	249
Gain in feedlot (lbs.)	454	473	518	515
Final feedlot weight	926	895	925	1040
Slaughter weight ⁽¹⁾	890	845	897	1010
Carcass weight ⁽²⁾	540	509	535	626
Dressing percentage ⁽³⁾	60.7	60.2	59.6	62.0
Slaughter grade	11.8	12.0	13.7	11.0
Carcass grade	12.5	10.5	13.3	13.0
Rib eye area (sq.in.)	10.9	9.7	10.3	9.7

(1) 14 hours from feedlot to slaughter. No food or water during this period.

(2) Cold (hot shrunk 3%)

(3) Slaughter weight and cold carcass.

DATA ON ANIMALS SLAUGHTERED

Alabama Station

Location Herd	Auburn - - - -	Auburn - - - - Crossbreeding - -	Auburn - - - -	Auburn - - - -
Breed of sire	Hereford	Hereford	Shorthorn	Shorthorn
Breed of dam	Angus	Shorthorn	Angus	Hereford
Sex	Steer	Steer	Steer	Steer
No. slaughtered	3	2	4	3
Age at slaughter	595	598	580	581
Time in feedlot (days)	249	249	249	249
Gain in feedlot (lbs.)	442	511	497	552
Final feedlot weight	897	1095	1005	1045
Slaughter weight ⁽¹⁾	865	1045	974	1002
Carcass weight ⁽²⁾	523	644	584	604
Dressing percentage ⁽³⁾	60.5	61.6	60.0	60.3
Slaughter grade	12.7	13.0	12.2	12.7
Carcass grade	12.7	13.0	13.5	12.7
Rib eye area (sq.in.)	10.2	9.8	9.6	10.0

- (1) 14 hours from feedlot to slaughter. No food or water during this period.
- (2) Cold (hot shrunk 3%).
- (3) Slaughter weight and cold carcass.

Arkansas Station

by

C. J. Brown

I. PROJECT: Hatch 170 (S-10)

Evaluation of Performance Records of Beef Cattle

II. OBJECTIVES:

- A. Continue to develop practical but adequate methods for identifying, evaluating and propagating the genetic potential for the production of beef. This would involve determining the kind and number of performance records necessary to prove beef sires and dams as well as the proper use of records in planning matings.

III. PERSONNEL:

C. J. Brown, W. Gifford, R. Honea, J. E. Gage, N. G. Covington, and C. Melton.

IV. ACCOMPLISHMENTS:

1. Scope and nature of work: Purebred Hereford, Aberdeen Angus, and Shorthorn cattle were used in the evaluation of performance and performance traits according to the project outline. Data indicating fertility, survival, rate and pattern of growth, mothering ability, feed utilization, conformation, longevity and carcass data were recorded and are being analyzed to study environmental effects, genetic and phenotypic relationships among traits. Data recorded include monthly weights and quarterly measurements on 705 young cattle, semi-annual weights and measurements on 478 older cattle, independent type classification by 4 judges on 815 cattle, daily feed records, gains and individually fed performance of 79 young bulls and complete carcass cut-out with taste panel evaluation of 35 bulls and 11 steers.
2. Research results: Analysis and evaluation of existing records were continued. Least squares estimates of the effects of years and season of birth, sex, sire, and age of dam on the weight of beef calves at 300, 360, 420, and 480 days were obtained in the three herds of cattle on which estimates of these factors had been previously obtained at 60 day intervals during the preweaning growth period. A comparison of bulls and steers for 76 traits was reported. The relationships among performance traits, carcass traits, chemical analysis and eating quality were studied. The relationship of performance traits to semen quality and semen quality scores to fertility of bulls used under natural service was reported. Analysis and summary of performance testing data are nearing completion.

V. FUTURE PLANS:

Futute plans are to continue collection of data and evaluation of recrcds dealing with rate and efficiency of gain, visual appraisal, growth and development, mothering ability and reproduction according to project outlines. .

VI. PUBLICATIONS:

Brown, C. J. 1960. Using djusted Calf Weights to Evaluate Beef Cattle Records. Ark. Farm Res. 9:1:5.

Brown, C. J., E. V. Krehbiel, C. Mabry and W. Gifford. 1960. Selection for Type in a Small Herd of Aberdeen-Angus Cattle. Ark. Exp. Sta. Bul. 628.

Brown, C.J. 1960. Influence of Year and Season of Birth, Sex, Sire and Age of Dam on Weights of Beef Calves at 60, 120, 180 and 240 Days of Age. J. Ani. Sci. 19:1062.

Bartee, John, C. J. Brown, and P. K. Lewis. 1961. The Relationship of Test Records to Eating Quality of Steaks from Beef Bulls and Steers Individually Fed on Performance Tests. Proc. Assoc. So. Agr. Workers.

VII. PUBLICATIONS PLANNED:

Bulletin on Bull Performance Test

Publication on Fertility

PERFORMANCE OF COW HERDS, 1960 CALVES

Arkansas Station

ARK (3)

Location	Main Sta. Spring Angus Angus	Main Sta. Fall Angus Angus	Livestock and Forres Spring Angus Angus	Livestock and Forres Fall Angus Angus	Main Sta. Spring Hereford Hereford	Main Sta. Fall Hereford Hereford	Main Sta. Spring Shorthorn Shorthorn	Main Sta. Fall Shorthorn Shorthorn
No. cows calving	59	54	24	28	41	42	9	
No. calves realised	59	48	20	26	37	40	9	
Av. inbr. of dams (%)	.02	.03	.0	.0	.0	.0	.0	
Av. inbr. of calves (%)	.0	.02	.0	.0	.0	.0	.06	
Av. birth date	10-9-59	3-8-60	10-6-59	3-1-60	10-18-59	3-13-60	10-18-59	3-12-60
Av. birth wt. (lbs.)	59	61	59	57	66	65	67	65
Av. weaning age	211	225	217	208	189	220	188	214
Av. weaning wt.	359	425	421	401	306	352	267	337
Av. weaning type score	9	11	8	12	9	11	7	11
Av. weaning cond. score								
Were calves creep fed?	No	No	Yes	Yes	No	No	No	No
Adjusted ⁽¹⁾ ADG birth to weaning	1.27	1.68	1.48	1.40	1.20	1.46	1.12	1.57

(1) Corrected for sex and age of dam.

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
(or pastured for high gains)

Arkansas Station

Location Line or group Breed of sire Breed of dam	Co-op Spring Hereford Hereford	Co-op Fall Charbray	Main Sta. Spring Bull-Steer Comparison	L. and Forestry (Batesville) Spring Angus Fall Angus	
BULLS, No.	4	4	11		
Av. initial age (days)	318		235		
Av. initial wt. (lbs.)	476	533	433		
Av. no. days on feed	154	154	154		
Av. final weight	846	930	732		
Av. daily gain	2.40	2.58	1.78		
Av. score					
Conformation	10		9		
Av. feed per day	18.34	21.06	15.80		
Concentrates	12.22	14.04	10.53		
Roughage	6.12	7.02	5.27		
Feeding regime	-- Individually fed --		-- -- --		
STEERS, No.			11		
Av. inbreeding (%)			.01		
Av. initial age (days)			232		
Av. initial wt. (lbs.)			444		
Av. no. days on feed			154		
Av. final weight			686		
Av. daily gain			1.48		
Av. score					
Conformation			9		
Av. Feed per day			15.61		
Concentrates			10.41		
Roughage			5.20		
Feeding regime			Individual		
HEIFERS, No.				9	10
Av. inbreeding (%)				0	0
Av. initial age (days)				240	240
Av. initial wt. (lbs.)				427	407
Av. no. days on feed				120	120
Av. final weight				488	497
Av. daily gain				.51	.75
Av. score					
Conformation				68	69
Feeding regime				Group fed hay and grain	

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
(of pastured for high gains)

Arkansas Station

Location	Main Sta.		Main Sta.		Main Sta.		Co-op
Line or group	Spring	Fall	Spring	Fall	Spring	Fall	Spring
Breed of sire	Hereford		Angus		Shorthorn		Angus
Breed of dam	Hereford		Angus		Shorthorn		Angus
BULLS, No.	15	24	13	14	3		5
Av. inbreeding (%)	.01	.0	.0	.0	.0		-
Av. initial age (days)	242	209	244	206	245		-
Av. initial wt. (lbs.)	418	361	472	367	452		447
Av. no. days on feed	154	154	154	154	154		154
Av. final weight	738	671	900	675	792		748
Av. daily gain	2.10	2.01	2.78	2.00	2.21		1.95
Av. score							
Conformation	9	10	10	10	9		9
Av. feed per day	15.95	15.72	15.77	16.06	19.09		15.92
Concentrates	10.63	10.48	10.52	10.71	12.73		10.61
Roughage	5.32	5.24	5.25	5.35	6.36		5.31
Feeding regime	Individually fed, long hay and grain separately.						
STEERS, No.				15			
Av. inbreeding (%)				.0			
Av. initial age (days)				277			
Av. initial wt. (lbs.)				423			
Av. No. days on feed 100				129			
Av. final weight				604			
Av. daily gain				1.04			
Av. score							
Conformation				9			
Feeding regime				Group fed			
HEIFERS, No.	13	13	13	26		3	
Av. inbreeding (%)	.0	.0	.03	.0		4	
Av. initial age (days)	240	240	240	240		240	
Av. initial wt. (lbs.)	358	348	395	361		342	
Av. no. days on feed	120	120	120	120		120	
Av. final weight	443	426	501	444		382	
Av. daily gain	.71	.65	.88	.69		.33	
Av. score							
Conformation	63	66	64	65		57	
Feeding regime	- - -	- - -	Group fed	- - -	- - -	- - -	- - -

DATA ON ANIMALS SLAUGHTERED

Arkansas Station

Location Herd	Main Sta. Spring	Main Sta. Fall	Main Sta. Fall	Main Sta. Special	Main Sta. Special
Breed of sire	Purebred	Purebred	Purebred	Purebred	Purebred
Breed of dam	Hereford and Angus	Hereford and Angus	Angus Angus	Hereford and Angus	Hereford and Angus
Sex	Bulls	Bulls	Steers	Steers	Bulls
No. Slaughtered	8	11	14	11	11
Age at slaughter (days)	415	363	407	404	408
Time in feedlot (days)	176	164	127	154	154
Gain in feedlot (lbs.)	320	314	189	242	299
Final feedlot weight ⁽¹⁾	723	669	614	685	734
Hot Carcass weight	403	374	330	396	432
Dressing percentage ⁽²⁾	55.7	55.9	53.7	57.8	58.8
Carcass grade	10	10.5	11.5	10.6	8.7
Rib eye area (sq.in.)	9.05	8.20	9.54	10.19	11.9
W-B Shear					
Core size	1 in.	1 in.	1 in.	1 in.	1 in.
Shear Force (lbs.)	17.2	-	-	25.64	26.33
Fat thickness over rib eye (ins.)	-	.36	.33	-	-

(1) Final feedlot weight taken about 18 hours prior to slaughter. This is not a shrunk weight:

(2) Hot carcass weight / final feedlot weight.

Florida Station

by

Marvin Koger

I. PROJECT: 752

Genetics of Dwarfism in Beef Cattle.

II. OBJECTIVES:

- (1) To characterize the various types of dwarfism in beef cattle in Florida.
- (2) To investigate the genetic relationship between the more prevalent types of dwarfism.
- (3) To determine the influence of genetic environment on expression of the snorter dwarf gene.

III. ACCOMPLISHMENTS:

This years' matings concluded critical test matings of the Snorter Hereford, Midget Brahman and Guinea (Dexter). The results from the previous years' matings confirm previous findings that: 1) A high frequency of dwarf genes result in numerous resorbed fetuses, abortions, and stillbirths among normal appearing calves. 2) Mating of carriers of the Dexter gene (Guinea) with known carriers of the Snorter gene has resulted in two (2) observed Dexter type "bulldog monsters" plus numerous resorptions and 3) Mating of Snorter dwarf bulls to known carrier females of mixed breeding has produced less than one-half dwarf progeny which would be expected on the basis of a simple Mendelian recessive.

Cooperative work with the Medical School established that the Snorter dwarf excretes in the urine an acid Mucopolysaccharide similar or identical to chondroitin sulphuric acid-B, the same polysaccharide found in the urine of humans affected with a form of dwarfism known as the Hurler syndrome or gargolylism. These forms of dwarfism in the two species show other phenotypic similarities also. Work on excretion of this polysaccharide by carrier and non-carrier cattle continues.

IV. FUTURE PLANS:

Classification of this years' calves will terminate the project as presently outlined. The project is being revised to expand work on polysaccharide excretion by various genotypes for the Snorter gene and by dwarfs of various forms.

V. PUBLICATIONS:

Koger, M., A. C. Warnick, J. F. Hentges and A. E. Loricz. Mucopolysaccharidosis in Snorter Dwarf Cattle. Journal of Animal Science 19:1221. 1960.

PERFORMANCE OF COW HERDS. 1960 CALVES

Florida Station
Beef Research Unit

Line or group Breed of sire Breed of dam	Angus Angus Angus	A X B Angus B X A	A X B Brahman A X B	A X H Angus H X A
No. cows calving No. calves raised	19 17	38 32	14 12	10 10
Av. weaning age Av. weaning wt	241 421	227 449	219 438	243 399
Av. weaning type score Av. weaning condition score	11.5 10.7	9.9 9.5	8.8 9.7	10.7 10.6
Were calves creep fed?	No	No	No	No
Adjusted ⁽¹⁾ av. daily gain from birth to weaning	1.57	1.74	1.77	1.53
Line or group Breed of sire Breed of dam	A X H Hereford A H	Hereford Hereford Hereford	H X SG Hereford SG X H	H X SG S G H X SG
No. cows calving No. calves raised	18 17	8 7	26 24	24 18
Av. weaning age Av. weaning wt.	230 456	231 478	226 482	224 449
Av. weaning type score Av. weaning condition score	11.9 11.7	10.4 10.9	11.3 11.7	9.1 9.1
Were calves creep fed?	No	No	No	No
Adjusted ⁽¹⁾ av. daily gain from birth to weaning	1.82	1.76	1.92	1.81

(1) Adjusted to steer sex and mature age of dam.

PERFORMANCE DATA ON YEARLING OR OLDER CATTLE NOT IN BREEDING HERDS
IN 1959

Location Line or group Breed of sire Breed of dam	BRU British Angus Angus	BRU A X H A X H Crossbred	BRU A X B A and B Crossbred	BRU H X SG H and SG Crossbred	BRU Hereford Hereford Hereford
Sex	F	F	F	F	F
Number	7	12	12	12	8
Initial					
Date	8-17-59	8-17-59	8-17-59	8-17-59	8-17-59
Age (days)	241	223	237	225	231
Weight (lbs.)	432	396	425	391	429
Score					
Condition	10.9	9.9	9.4	9.3	10.9
Pasture plus limited supplement from November to March.					
Final					
Date	8-18-60	8-18-60	8-18-60	8-18-60	8-18-60
Age	607	589	603	591	597
Weight	611	650	678	651	674
Score					
Condition	6.1	6.9	6.8	6.7	6.6
Gain per day of age	1.01	1.10	1.12	1.10	1.13

Ona, Florida Station
Range Cattle Experiment Station

by

W. G. Kirk

I. PROJECT: State Project 615

Influence of Breed Composition and Level of Nutrition on Adaptability of Cattle to Central Florida Conditions.

II. OBJECTIVES:

To determine the relative productivity of cows of different proportions of Shorthorn and Brahman and blood when kept on pasture programs designed to supply low, medium and high nutrition levels.

III. PERSONNEL:

W. G. Kirk, Vice-Director in Charge, Range Cattle Experiment Station, Ona.
E. M. Hodges, Agronomist, Range Cattle Experiment Station, Ona.
F. M. Peacock, Asst. An. Husbandman, Range Cattle Experiment Station, Ona.
Marvin Koger, Animal Husbandman, Main Station, Gainesville.

IV. ACCOMPLISHMENTS:

1. Breeding: Production of Shorthorn and Brahman breeds and their crosses under pasture programs to supply low, medium and high nutrition levels.
2. Report of 4 years work at Beef Cattle Short Course, April 20-22, 1961: 689 cow-breeding seasons, 476 weaned calves, 69% weaned calf crop; heaviest calves at 205 days of age were $3/4$ Br- $1/4$ Shr, 448 pounds, followed by $3/4$ Shr- $1/4$ Br, 418 pounds, both lots of calves out of $1/2$ Sh- $1/2$ Br cows; crossbred cows bred to Shorthorn bulls had the highest calf crop followed by the same breed of cows bred to Brahman bulls; purebred Brahman and Shorthorn cows had the lowest overall production with the Shorthorn at the bottom; easiest to maintain herd production on medium level of nutrition compared to those on high level and low level.

V. FUTURE PLANS:

Changed breeding in all 3 herds in the 1961 season. Brahman, $3/4$ Br- $1/4$ Sh and one half of the Sh-Br crossbred cows bred to a Shorthorn bull and one half crossbred, $3/4$ Sh- $1/4$ Br and Shorthorn cows to Brahman bulls. This change will be for 3 breeding seasons.

VI. PUBLICATIONS:

Kirk, W. G., E. M. Hodges, F. M. Peacock and M. Koger. Effect of level of nutrition on weaning performance of cattle with varying proportions of Brahman-Shorthorn breeding at the Range Cattle Station. Beef Cattle Short Course on Crossbreeding of Cattle, University of Florida, Gainesville, April 20-22, 1961

Peacock, F. M., and W. G. Kirk. Feed Lot Performance and Carcass Grades of Brahman and Brahman-Shorthorn Steers. Fla. Agr. Exp. Sta. Bul. 597. 1958.

Peacock, F. M., W. G. Kirk, E. M. Hodges, W. L. Reynolds and Marvin Koger. Genetic and enviornmental influence on weaning weight and slaughter grade of Brahman, Shorthorn and Brahman-Shorthorn crossbred calves. Fla. Agr. Exp. Sta. Bul. 624. 1960.

Reynolds, W. L., W. G. Kirk, F. M. Peacock, M. Koger and A. C. Warnick. Reproductive Performances of crossbred and straightbred cattle on differencet pasture programs in Florida. Manuscript prepared for presentation to Editors of Jour. An. Sci. 1961.

VII. PUBLICATIONS PLANNED:

Expect to begin preparation of manuscript on this project in the near future.

PERFORMANCE OF COW HERDS. 1960 CALVES

Range Cattle Station
Ona, Florida

Location Breed of sire Breed of dam	Ona Brahman Brahman	Ona Brahman 3/4 Bra.	Ona Brahman F ₁	Ona Shorthorn F ₁	Ona Shorthorn 3/4 Sh.	Ona Shorthorn Shorthorn	Ona All Other
No. cows calving	25	24	20	20	20	17	204
No. calves raised	25	22	17	20	19	17	190
Av. weaning age	235	235	238	250	243	245	220
Av. weaning wt.	394	436	485	425	403	327	435
Av. weaning type score	9.3	9.6	10.0	10.4	10.2	10.2	9.7
Av. weaning condition score	8.3	8.3	9.6	9.3	8.7	7.6	8.9
Were calves creep fed?	No	No	No	No	No	No	No
Adjusted av. daily gain from birth to weaning	1.53	1.66	1.88	1.58	1.57	1.21	1.84

Brooksville, Florida Station

by

W. C. Burns

I. PROJECT: 629 (S-10)

Selection of Cattle for Beef Production in Southeastern United States.

II. OBJECTIVES:

To improve the reproductive efficiency and meat producing qualities of different strains of cattle under Florida conditions, to test various breeding systems with these cattle, and to determine if combining ability can be increased by cross-progeny testing.

III. PERSONNEL:

W. C. Burns, Superintendent; Marvin Koger, A. C. Warnick, A. Z. Palmer, University of Florida, Gainesville; C. M. Kincaid, Regional Coordinator, S-10, Knoxville, Tennessee.

IV. ACCOMPLISHMENTS DURING THE YEAR:

1. Scope and nature of work.

A total of 288 cows (62 Angus, 32 Brahman, 72 Brahman-Angus, 68 Hereford and 54 Santa Gertrudis) were in breeding herds in 1960. This was an increase of 59 head over 1959. Land clearing, renovation, seeding and fencing was continued in the Turnley Area to be used for added work in the future. Production and selection procedures were continued in accordance with the project outline.

Test feeding of out side bulls was discontinued with only station owned bulls (37 head) on feeding tests. Fifty-seven steer calves were fed out on post-weaning feeding tests starting immediately after weaning with carcass information obtained on them at the end of the test. Evaluation of creep feeding during the suckling period was continued with half of the calves in each sire progeny having access to a grain mixture in creeps and the other half receiving no supplemental feed.

A complete new set of cattle working pens and scales was installed at the main station.

2. Research results.

A five year summary (through 1958) of performance by the Angus, Hereford, Brahman, Brahman-Angus and Santa Gertrudis herds was completed. Angus and Herefords had reasonably satisfactory calving percentages of 88%

and 81% while the Brahman, Brangus, and Santa Gertrudis were lower with 65%, 77% and 66% respectively. Weights at 180 days were low for Angus and Herefords at 340 and 316 pounds while the remaining groups reached 355, 382, and 435, respectively. Differences in total production per cow were not large but the Brahman was lower than the other four breeds.

V. FUTURE PLANS:

An experiment to measure specific combining ability will be initiated during the next two years. This work will be on the Turnley Area now under development and will include the Angus cows presently in the herd and Brahman-Angus cows to be acquired as facilities are available.

Plans are under way to obtain information on genetic environmental interactions in cattle by making reciprocal exchanges of breeding stock between Brooksville, Florida and Miles City, Montana. A sample half of the Montana Line "1" cattle will be transferred to Brooksville and half of the Brooksville Hereford line will be transferred to Montana. Reciprocal exchanges of breeding stock will probably be initiated in 1961 but a few years will be required to fully implement the project.

VI. PUBLICATIONS:

Burns, W. C., M. Koger, and C. M. Kincaid. 1958. Feed Lot Response of Steers to Different Rations and Hormone Treatment. J. Animal Sci. 17:1143. (abstract)

PERFORMANCE OF COW HERDS. 1960 CALVES

Brooksville, Florida Station

Br. Fla. (3)

Location Line or group Breed of sire Breed of dam	Brooksville Angus Angus Angus	Brooksville Brahman Brahman Brahman	Brooksville Brangus Brangus Brangus	Brooksville Hereford Hereford Hereford	Brooksville S. Gertrudis S. Gertrudis S. Gertrudis
No. cows calving	53	26	57	44	42
No. calves raised	33	22	36	39	30
Av. birth date	1/15/60	1/22/60	1/18/60	1/8/60	1/23/60
Av. birth wt. (lbs.)	54.1	61.1	59.5	58.4	66.0
Av. weaning age	226	218	223	233	219
Av. weaning wt.	376	423	438	363	475
Av. weaning type score	11.0	9.7	10.1	11.1	10.2
Av. weaning condition score	9.3	9.6	10.6	9.1	10.4
Were calves creep fed?	One-half of calves from each breed were creep fed.				
Adjusted(1) av. daily gain from birth to weaning	1.50	1.73	1.78	1.45	1.93

(1) Adjusted both for sex and age of dam.

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
(or pastured for high gains)

Brooksville, Florida Station

Location	- - - - - Brooksville - - - - -				
Line or group	Angus	Brahman	Brangus	Hereford	S. Gert.
Breed of sire	Angus	Brahman	Brangus	Hereford	S. Gert.
Breed of dam	Angus	Brahman	Brangus	Hereford	S. Gert.
BULLS, No	6	4	8	8	11
Av. initial age (days)	281	283	293	302	270
Av. initial wt. (lbs.)	489	536	589	556	600
Av. no. days on feed	140	140	140	140	140
Av. final weight	853	891	947	875	925
Av. daily gain	2.60	2.60	2.60	2.30	2.30
Av. score					
Condition	10.0	8.0	10.0	9.4	7.4
Av. feed per day	Bulls were fed 3% body wgt of a concentrate consisting of 15% 41% CSM, 50% ground snapped corn, 20% citrus molasses and 15% rolled oats, fed once daily. Hay fed free choice.				
STEERS, No.	16	4	23	7	7
Av. initial age (days)	224	212	218	231	213
Av. initial wt. (lbs.)	347.6	321.2	384.1	351.1	470.4
Av. no. days on feed	156	156	156	156	156
Av. final weight	599.0	622.5	687.6	637.3	772.8
Av. daily gain	1.16	1.39	1.39	1.31	1.54
Av. score					
Condition	9.0	6.0	8.6	6.8	7.3
HEIFERS, No.	19	7	19	10	14
Av. initial age (days)	226	208	222	234	215
Av. initial wt. (lbs.)	414.8	379.0	416.0	428.0	485.0
Av. no. days on feed	158	158	158	158	158
Av. final weight	563.8	552.0	589.0	600.0	635.0
Av. daily gain	.94	1.09	1.09	1.09	.95
Av. score					
Condition	10.2	8.9	9.8	10.4	11.0
Av. feed per day	Control group received 2 lbs. 41% CSM, 4 lbs. citrus molasses per day plus hay free choice. Second group received the same except the addition of 1 lbs. sawdust.				

PERFORMANCE DATA ON YEARLING OR OLDER CATTLE NOT IN BREEDING
HERDS IN 1959

Location	- - - - -	- - - - -	Brooksville	- - - - -	- - - - -
Line or group	Angus	Brahman	Brangus	Hereford	S. Gert
Breed of sire	Angus	Brahma	Brangus	Hereford	S. Gert.
Breed of dam	Angus	Brahman	Brangus	Hereford	S. Gert.
Sex	Heifer	Heifer	Heifer	Heifer	Heifer
Number	17	5	28	16	21
Initial					
Date	8/24/59	8/24/59	8/24/59	8/24/59	8/24/59
Age (days)	267	257	264	291	280
Weight (lbs.)	587	617	647	588	675
Score					
Condition	6.5	6.2	6.4	6.7	6.3
First period					
Feeding regime	2 lbs. 41% CSM, 4 lbs. molasses, hay free choice - one group receiving sawdust .				
No. days	63	63	63	63	63
Gain per head	70	52	60	66	73
Gain per day	1.11	.83	.95	1.05	1.16
Second period					
Feeding regime	Same as first period				
No. days	127	127	127	127	127
Gain per head	-3.0	-4.8.	-6.	-8.	-4.
Third period					
Feeding regime	No supplement on pasture				
No. days	179	179	179	179	179
Gain per head	193	260	223	208	184
Gain per day	.62	.69	.71	.65	.59
Final					
Date	- - - - -	- - - - -	8/28/60	- - - - -	- - - - -
Age	636	626	633	660	649
Weight	847	881	923	854	928
Score					
Condition	6.5	6.0	6.9	6.6	6.5

DATA ON ANIMALS SLAUGHTERED

Brooksville, Florida Station

Location	Brooksville				
Herd	Angus	Brahman	Brangus	Hereford	S. Gert.
Breed of sire	Angus	Brahman	Brangus	Hereford	S. Gert.
Breed of dam	Angus	Brahman	Brangus	Hereford	S. Gert.
Sex	Steer	Steer	Steer	Steer	Steer
No. slaughtered	16	4	23	7	7
Age at slaughter	428	433	426	420	435
Time in feedlot (days)	156	156	156	156	156
Gain in feedlot (lbs.)	251	301	304	284	303
Final feedlot weight	599	622	688	637	773
Slaughter weight ⁽¹⁾					
Carcass weight ⁽²⁾	338	363	401	355	453
Dressing percentage ⁽³⁾	56.3	58.3	58.4	55.7	58.6
Carcass grade	9.0	6.0	8.6	6.8	7.3
Rib eye area (sq.in.)	2.02	2.21	2.01	2.00	1.79
W-B Shear					
Shear Force (lbs.)	8.3	10.7	9.1	9.2	9.5

- (1) Final weights on steers taken one morning and slaughtered next day. No weight taken just prior to slaughter.
- (2) Carcass weights were chilled weights.
- (3) Dressing % calculated by shrinking the final weight 3% and the chilled carcass weight.

Ga (1)

Georgia Station

by

W. C. McCormick

I. PROJECT: 2-44 (S-10)

Improvement of Performance and Carcass Quality in Beef Cattle through Selection.

II. OBJECTIVES:

- A. To develop herds of Polled Hereford and Angus cattle with superior performance.
- B. To progeny test Polled Hereford and Angus sires with selection criteria based primarily on pre- and post-weaning growth rate, and carcass meatiness and tenderness.

III. PERSONNEL:

W. C. McCormick, Animal Husbandman; D. W. Beardsley, Associate Animal Husbandman; R. L. Saffle, Food Technologist; B. L. Southwell, Head, Animal Husbandry Department.

IV. ACCOMPLISHMENTS DURING THE YEAR:

The Polled Hereford herd of approximately 100 females was mated to five sires. Three of these sires (452, 583, and 627) were bred to cows with at least one complete record while two of the sires (747 and 853) were mated to heifers and cows with incomplete records. The Angus herd was divided at breeding. Part of the herd was pasture bred to sire 181, while the remainder was artificially inseminated to Elector of Shempston, a bull currently owned by American Breeders Service.

The calves were born in January, February, and March. They were weaned September 13, 1960. All bull calves were fed in drylot for 168 days, beginning at weaning. The calves from bulls 747 and 853 were fed in sire groups. All heifers considered prospective breeders were grazed on permanent and annual pastures. These heifers were fed a limited amount of grain immediately following weaning until small grain pasture was ready for grazing. Thereafter, they did not receive supplemental feed. The remainder of the heifers were fed in drylot. At the end of the feeding period, four bulls and three heifers sired by 853 and the same number sired 747 were slaughtered. Data obtained from offspring of five Polled Hereford and two Angus sires follow:

Growth and Feedlot Data

<u>Breed</u>	<u>Sire</u>	<u>No. Bull calves</u>	<u>Weaned weaned</u>	<u>Feedlot Daily gain</u>	<u>Avg. final age</u>	<u>Wt./day of age</u>	<u>Type Score</u>
P.H.	747	8	501	2.26	391	2.25	12.2
P.H.	853	9	483	2.33	385	2.27	12.1
P.H.	452	14	515	2.42	400	2.33	12.2
P.H.	583	2	484	2.53	389	2.35	12.3
P.H.	627	5	479	2.52	388	2.33	12.4
A.	181	10	471	2.14	385	2.14	11.9
A.	Shemps-ton	10	490	2.27	395	2.21	12.1

Carcass Data

<u>Breed</u>	<u>Sire</u>	<u>No. Killed</u>	<u>Avg. Dressing Percent</u>	<u>Avg. Fat thickness rib eye, ins.</u>	<u>Avg. Rib Eye area per ct. Carcass</u>	<u>Avg. Carcass wt./day of age</u>	<u>Avg. carcass length</u>
P.H.	747	7	56.4	0.39	2.33	1.12	43.71
P.H.	853	7	56.3	0.32	2.39	1.15	44.54

Steaks were taken for use in obtaining shear force values; however, this information was not complete at report time. Feed efficiency for bull calves sired by 747 and 797 while the bull calves sired by 853 required 757 pound feed per 100 pounds.

V. FUTURE PLANS:

Continue project as outlined.

VI. PUBLICATIONS DURING THE YEAR:

Routine annual reports.

VII. PUBLICATIONS PLANNED:

None.

* * * * *

I. PROJECT : (S-10) (AHRD d1-3)

Selection of Beef Cattle for Single Items of Importance in Profitable Beef Production.

II. OBJECTIVES:

- A. To obtain preliminary information on the relative effectiveness of selecting for a single character.
- B. To observe trends in characters for which no selection is made when selection is for a single character.

III. PERSONNEL:

W. C. McCormick, Animal Husbandman; T. M. Clyburn, Assistant Animal Husbandman; B. L. Southwell, Head, Animal Husbandry Department.

IV. ACCOMPLISHMENTS DURING THE YEAR:

- A. Four herds of 50 Grade Polled Hereford breeding females each have been established at the Georgia State Prison Farm at Reidsville. In three herds selection of replacements is based on (1) weaning weight, (2) rate of post-weaning gain and (3) weaning scores. For the fourth or "average herd" replacements are selected whose records are nearest average for each trait. Bulls for these herds are selected from the breeding groups at Tifton.
- B. During the 1959 breeding period, approximately 40 females in each herd were mated. The average performance of calves in these herds was as follows:

Herd	No. calves weaned	Av. birth weight	ADG-birth to weaning	Weaning Scores		Rate of gain post-weaning
				Type	Condition	
"Wean Weight"	34	69.8	1.66	10.4	9.7	0.53
"Rate of Gain"	34	73.5	1.57	9.9	9.2	0.54
"Score"	30	65.9	1.59	10.4	9.9	0.53
"Average"	31	69.7	1.58	10.0	9.2	0.52

- C. Records of all calves were used in all calculations except rate of post-weaning gain. Only the heifer calves (10 to 20 per herd) were used in these calculations. The calves were born from January to March and weaned September 15 and 16. Rate of post-weaning gain was calculated for the period beginning at weaning and ending April 10.

V. FUTURE PLANS:

Continue project as outlined.

VI. PUBLICATIONS DURING THE YEAR:

Routine annual reports.

VII. PUBLICATIONS PLANNED:

None.

I. PROJECT: Animal Husbandry 209 (S-10) (AHRD dl-3)

A Study of Grading, Crisscrossing, and Rotational Crossing as Breeding Systems for Commercial Beef Production.

II. OBJECTIVES:

- A. To study the relative value of grading, crisscrossing, and rotational crossing as breeding systems for commercial beef production.
- B. To study heterotic effects in crosses between Angus and Polled Hereford breeds as compared to heterosis in crosses between these breeds and Santa Gertrudis, a breed based partially on a Brahman foundation.
- C. To study the comparative value of the Santa Gertrudis breed with the Angus and Polled Hereford breeds.

III. PERSONNEL:

W. C. McCormick, Animal Husbandman; T. M. Clyburn, Assistant Animal Husbandman; R. L. Saffle, Food Technologist; B. L. Southwell, Head, Animal Husbandry Department.

IV. ACCOMPLISHMENTS DURING THE YEAR:

- A. The herds of cattle were established at the Georgia State Prison from animals born in 1954 to 1957. The three grade and crisscross herds contain approximately forty breeding females while the rotational herd has sixty females. The calves were born primarily in January, February, and March. All were weaned from September 15 to October 1. During the breeding season the cows were divided into bull units; thereafter they were managed in larger groups.

- B. Data recorded for the 1960 calf crop was as follows:

Herd	Breeding System	Weaning Information			Av. Wt.	ADG to weaning	Av. type score	Av.
		No. Calves	Av. birth wt.	Av. age days				condition score
Gr. A.	Grading up	33	61	221	388	1.49	10.6	9.5
Gr. PH	Grading up	37	70	218	397	1.50	9.7	8.0
Gr. SG	Grading up	36	78	213	468	1.84	8.9	9.2
AxPH	Crisscrossing	35	66	226	423	1.59	10.1	9.1
AxSG	Crisscrossing	31	73	215	417	1.61	9.6	9.5
PHxSG	Crisscrossing	31	76	220	476	1.82	9.6	9.5
AxPHxSG	Rotational crossing	51	72	217	448	1.74	9.6	9.4

- C. From the 1959 calves, eight steers each from the grade and crisscross herds and twelve from the rotational herd were selected at weaning for growth and carcass studies. These 60 steers were placed

on small grain pasture in November. They were transferred to millet pastures in May. The entire grazing period was 300 days. These steers were grown out without supplemental feed except for mineral mixtures. The steers were slaughtered in the prison farm abattoir. Carcass weights are the warm weights. Dressing percent was based on this weight and the unshrunk final weight. Cores for shear test were one-half inch. Data for this group of steers was as follows:

Herd	Growth and Carcass Data						
	A	H	SG	AxH	AxSG	HxSG	AxHxSG
Average Daily Gain							
Pre-weaning	1.63	1.53	2.17	1.79	1.77	1.90	1.83
Post-weaning	1.57	1.77	1.78	1.77	1.73	1.74	1.71
Final weight	912	939	1071	1020	984	988	985
Final age	571	565	562	583	566	557	566
Wt./day of age	1.60	1.66	1.91	1.75	1.74	1.78	1.74
Slaughter grade	9.3	8.8	7.8	8.7	8.3	8.5	9.0
Carcass wt.	515	512	615	578	556	569	564
Carcass length	46.5	46.9	49.6	48.2	47.9	47.9	47.4
Sq. Ins. Loin eye per cwt. carcass	1.95	1.70	1.54	1.73	1.81	1.81	1.81
Carcass grade	10.1	8.3	8.4	9.6	8.8	8.6	9.7
Shear force	10.2	9.5	12.1	9.1	11.5	11.6	10.8
Carcass wt./day of age	.90	.90	1.10	.99	.98	1.02	1.00

V. FUTURE PLANS:

Studies will be continued. Replacement heifers are being selected as fast as possible. One-half of generation one replacements have been selected.

VI. PUBLICATIONS DURING THE YEAR: Routine annual reports.

Effects of breed and cross on growth rate and carcass characteristics of beef steers. T. M. Clyburn, W. C. McCormick, R. L. Saffle, and B. L. Southwell. Presented at 58th Annual Meeting on the Association of Southern Agricultural Workers on February 6-8, 1961.

VII. PUBLICATIONS PLANNED: A summary of the data after the 1961 calves are weaned.

PERFORMANCE OF COW HERDS. 1960 CALVES

Georgia Coastal Plain Experiment Station

Location	Tifton	Tifton P.Hereford	Reidsville "Wean Wt." P.Hereford Gr.P.Hereford	Reidsville "Score" P.Hereford Gr.P.Hereford	Reidsville "Average" P.Hereford Gr.P.Hereford	Reidsville "Rate of Gain" P.Hereford Gr.P.Hereford	
Line or group	Angus						
Breed of sire	Angus						
Breed of dam	Angus						
No. Cows calving	33	72	37	34	33	35	
No. calves raised	30	70	34	30	31	34	
Av. inbr. of dams (%)	-	-	-	-	-	-	
Av. inbr. of calves (%)	-	-	-	-	-	-	
Av. Birth date	2-4-60	1-31-60	2-5-60	2-8-60	2-7-60	2-9-60	
Av. birth wt. (lbs.)	65.5	72.6	69.8	65.9	69.7	73.5	
Av. weaning age	221	225	223	220	221	219	
Av. weaning wt.	467	477	438	416	420	418	
Av. weaning type score	11.1	10.9	10.4	10.4	10.0	9.9	
Av. weaning condition score	11.2	10.9	9.7	9.9	9.2	9.2	
Were calves creep fed:	Yes	Yes	No	No	No	No	
Adjusted(1) av. daily gain from birth to weaning	-	-	-	-	-	-	

- 54 -

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
(or pastured for high gains)

Georgia Coastal Plain Experiment Station

Location	Tifton	Tifton
Line or group	P. Herefords	P. Herefords
Breed of sire	Same	Same
Breed of dam	Same	Same
BULLS, No.	32	11
Av. Initial age (days)	248	258
Av. initial wt. (lbs.)	489	457
Av. No. days on feed	140	140
Av. final weight	889	822
Av. daily gain	2.86	2.61
Av. score		
Conformation	11.2	11.0
Condition	10.3	10.5
Av. feed per day	19.7	20.2
Feeding regime ⁽¹⁾	Full fed	Full fed
HEIFERS, No.	30	16
Av. initial age (days)	254	253
Av. initial wt. (lbs.)	467	408
Av. no. days on feed	140	140
Av. final weight	701	617
Av. daily gain	1.67	1.41
Av. score		
Conformation	11.9	11.7
Condition	10.2	10.0
Feeding regime ⁽²⁾	- - - Limited grain pasture - -	

(1) Bulls ration 1000 ground snapped corn, 200 pounds oats, 100 molasses 300 cottonseed meal, 50 alfalfa leaf meal, and 350 Coastal Bermuda hay.

(2) Heifers fed limited grain on small grain pasture.

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
(or pastured for high gains)

Georgia Coastal Plain Experiment Station

Location	Gr. A.	Gr. PH	Gr. SG	Reidsville	A x SG	PH x SG	AxPHxSG
Line or group				A x PH	A and SG	PH and SG	A, PH, SG
Breed of sire				A x PH	A x SG	PH x SG	AxPHxSG
Breed of dam							
STEERS, No.	8	8	8	8	8	8	12
Av. initial age (days)	271	265	262	283	266	257	266
Av. initial wt. (lbs.)	441	408	538	490	466	466	474
Av. no. days on feed	300	300	300	300	300	300	300
Av. final weight	912	939	1071	1020	984	988	985
Av. daily gain	1.57	1.77	1.78	1.77	1.73	1.74	1.71
Av. score	9.3	8.8	7.8	8.8	8.3	8.5	9.0
Condition (1)							
Feeding regime				-pasture			

GA (9)

(1) Pastured on small grain and millet.

DATA ON ANIMALS SLAUGHTERED

Georgia Coastal Plain Experiment Station

Location	Reidsville	Reidsville	Reidsville	Reidsville	Reidsville
Herd	Gd. Angus	Gd. Hereford	Gd. SG	A x H	A x SG
Breed of sire	Angus	Polled H.	S. G.	A x H	A x SG
Breed of dam	Gd. Angus	Gd. P. H.	Gd. SG	A x H	A x SG
Sex	Steers	Steers	Steers	Steers	Steers
No. slaughtered	8	8	8	8	8
Age at slaughter	571	565	562	583	566
Time in feedlot (days)	300	300	300	300	300
Gain in feedlot (lbs.)	471	531	533	530	518
Final feedlot weight	912	939	1071	1020	984
Slaughter weight ⁽²⁾	912	939	1071	1020	984
Carcass weight ⁽³⁾	515	512	615	578	556
Dressing percentage	56.5	54.6	57.4	56.7	56.5
Slaughter grade	9.3	8.8	7.8	8.7	8.3
Carcass grade	10.1	8.3	8.4	9.6	8.8
Rib eye area (sq.in.)	1.95	1.70	1.54	1.73	1.81
W-B Shear					
Core size	1/2	1/2	1/2	1/2	1/2
Shear Force (lbs.)	10.2	9.5	12.1	9.6	8.8
Length, inches	46.5	46.9	49.6	48.2	47.9

(1) Cattle pastured on small grain and millet.

(2) Final weight without shrink also slaughter weight.

(3) Carcass weight was warm weight.

DATA ON ANIMALS SLAUGHTERED

Georgia Coastal Plain Experiment Station

Location	Reidsville	Reidsville
Herd	H x SG	A x H x SG
Breed of Sire	H and SG	A, H, and SG
Breed of dam	H x SG	A x H x SG
Sex	Steers	Steers
No. slaughtered	8	12
Age at slaughter	557	566
Time in feedlot (days)	300	300
Gain in feedlot (lbs.)	522	511
Final feedlot weight	988	985
Slaughter weight	988	985
Carcass weight	569	564
Dressing percentage	57.5	57.2
Slaughter grade	8.5	9.0
Carcass grade	8.6	9.7
Rib eye area (sq.in.)	1.81	1.81
W-B Shear		
Core size	1/2	1/2
Shear Force (lbs.)	11.6	10.8
Length, inches	47.9	47.4

Kentucky Station

by

N. W. Bradley, D. G. Steele and W. Y. Varney

I. PROJECT TITLE:

A performance and progeny testing program for bulls of the beef breeds.
Animal Husbandry 260 (S-10)

II. OBJECTIVES:

To use rate of gain, efficiency of gain, conformation score and condition score of bull calves in an effort to determine the values these items should receive in predicting the future value of bulls in the breeding herd.

III. PERSONNEL:

University of Kentucky: N. W. Bradley, Associate Professor of Animal Husbandry (beef cattle); D. G. Steele, Professor of Animal Husbandry (genetics); W. P. Garrigus, Professor of Animal Husbandry, Head of Department of Animal Husbandry, Associate Director of Kentucky Agricultural Experiment Station; J. D. Kemp, Professor of Animal Husbandry (meats); W. Y. Varney, Assistant Professor of Animal Husbandry (meats).

IV. ACCOMPLISHMENTS:

Two 154-day bull performance tests were completed during the year. A total of 32 bulls were tested for rate and efficiency of gain. The group of 30 bulls included 25 Herefords, 6 Angus and 1 Charbray. The best over-all performance record was by a Polled Hereford bull as follows: A.D.G., 2.89; pounds per day of age, 2.74 and feed per cwt. gain, 664. This bull was 11 months old at the end of the test and was given a conformation score of average Choice. One of the poorer performing Hereford bulls made the following record: A.S.G., 1.71; pounds per day of age, 1.90 and feed per cwt. gain, 701. This contrast fairly well represents the variability which has existed throughout the beef bull performance test at the Kentucky station.

Eighteen Hereford calves and 18 Red Poll x Hereford calves sired by high and low gaining bulls were produced on the Mercer Farm during the past year. After weaning, 34 of the calves were individually self-fed a complete mixed fattening ration for 207 days. The roughage component of the 80 percent concentrate - 20 percent roughage ration was ground corn cobs. At the end of the postweaning period, all cattle were slaughtered and certain slaughter and carcass data were collected. One wholesale rib from each carcass was obtained for further carcass study.

The preweaning and postweaning performance is given in Table 1 by sire and breed. During the preweaning phase calves sired by the high gaining bull gained slightly faster than calves sired by the low gaining bull. As usual, Red Poll x Hereford calves were superior to Hereford calves with respect to birth weight by 6.5 pounds, weaning weight by 129 pounds and preweaning average daily gain by .41 pound. Hereford calves were scored slightly higher on conformation.

During the postweaning phase calves sired by the high gaining bull gained .17 pound per head daily faster than calves sired by the low gaining bull. The estimated slaughter grade of calves sired by the high gaining bull was almost one-third of a grade higher, but the difference between carcass grade was not quite as large. Feedlot gains of Herefords and crossbred calves were comparable, but considerably more feed per 100 pounds of gain was required by the crossbred calves. Carcass grades of Herefords and Red Poll x Hereford calves were also similar.

Table 2 shows the effect of sire, breed and sex on carcass characteristics. Carcasses from calves sired by the high gaining bull had .11 inch less fat over the rib eye and 1.22 square inches more ribeye or .2 square inch more ribeye per 100 pounds of carcass. Sire apparently affected none of the other carcass traits. Carcass grades for Herefords and crossbreds were similar, but carcass conformation was a little over one-third of a grade lower for crossbred calves. Red Poll x Hereford carcasses were also somewhat fatter as measured by fat thickness over the ribeye and had .2 square inch less ribeye area per 100 pounds of carcass than Hereford carcasses. The federal grader criticized carcasses from crossbreds for lacking beef conformation in the rounds and loins; however, the carcass grades of only three carcasses were reduced for lacking adequate beef conformation. Carcass conformation of steers was one-third of a grade higher than for heifers, but carcass grade was about the same. Heifer carcasses were slightly fatter, but ribeye area per hundredweight of carcass was identical for steers and heifers.

It is realized that for a study of this kind numbers are rather limited. Therefore, bulls and cow groups have been switched and the various observations will be repeated.

V. FUTURE PLANS:

The study of Hereford and Red Poll x Hereford calves sired by high and low gaining bulls will continue one more year.

The Kentucky project has been revised to include a 100-cow purebred Hereford herd in which selective breeding will be practiced. It is the purpose of this project to select for meat quality and quantity from among sires which have proven acceptable from a performance standpoint. Preweaning performance tests, postweaning performance tests and progeny tests will be used in selecting herd sires. Emphasis will be placed on ribeye area, physical separation of 9-10-11 rib cut and tenderness as measured by the Warner-Bratzler shear and taste panel. Numerous other carcass observations will also be made. All carcass data and performance data will be examined to reveal any meaningful relationships which may exist.

VI. PUBLICATIONS:

Performance and carcass characteristics of Red Poll x Hereford and Hereford calves slaughtered at weaning. N. W. Bradley, W. P. Garrigus and W. Y. Varney. Annual Livestock Field Day, University of Kentucky Animal Husbandry Mimeo. July 13, 1960.

Performance and progeny testing of beef bulls. N. W. Bradley, D. G. Steele, Bernard Jones and J. D. Kemp. Annual Livestock Field Day, University of Kentucky Animal Husbandry Mimeo. July 13, 1960.

Selection indices for beef cattle. 1961. R. H. White Ph. D. Thesis, University of Kentucky.

VII. PUBLICATIONS PLANNED:

Results will be published annually in the Kentucky Livestock Field Day Report and elsewhere as justified.

Table 1. Effect of Sire and Breed on Preweaning and Postweaning Performance of Hereford and Red Poll x Hereford Calves.

	Sire ¹		Breed	
	Low Gainer	High Gainer	Hereford	Red Poll x Hereford
<u>Preweaning</u>				
No. calves	17	19	18	18
Birth wt., lb.	72.0	71.0	68.2	74.7
Av. age, days	275	257	264	268
Weaning wt., lb.	547	533	475	604
A.D.G.	1.73	1.80	1.54	1.97
Adj. A.D.G. ²	1.87	1.91	1.68	2.14
Conformation score	10.5	10.0	10.6	9.9
<u>Postweaning - 207 Days in Drylot</u>				
No. calves	17	17	17	17
Sex of calves				
Steers	9	6	7	8
Heifers	8	11	10	9
Initial wt., lb. ³	511	500	449	562
Final wt., lb.	967	990	926	1030
Total gain	456	490	477	468
A.D.G.	2.20	2.37	2.30	2.26
Feed/cwt. gain, lb.	870	843	790	924
Carcass grade	12.3	11.7	12.3	11.7
Slaughter grade	11.7	10.8	11.3	11.2

¹Low gaining sire - A.D.G., 2.22; Lbs./day of age, 2.17; Feed/cwt. gain, 828.

²High gaining sire - A.D.G., 2.94; Lbs./day of age, 2.69; Feed/cwt. gain, 563.

³Adjusted for age of dam, sex of calf, season of birth.

³After weaning calves were hauled 35 miles and some were dehorned. Considerable weight was lost, although only one day elapsed from weaning until starting on the postweaning phase.

Table 2. Effect of Sire, Breed and Sex on Carcass Characteristics.

	Sire		Breed		Sex	
	Low Gainer	High Gainer	Hereford	Red Poll x Herefords	Heifers	Steers
No. of calves	17	17	17	17	19	15
Carcass grade ¹	12.3	11.7	12.3	11.7	11.9	12.1
Carcass conformation ¹	12.3	11.8	12.7	11.4	11.6	12.7
Dressing percent ²	61.5	61.1	60.5	61.0	61.3	61.3
Fat thickness over ribeye, in.	0.85	0.74	0.76	0.84	0.84	0.75
Ribeye area, sq. in.	9.54	10.76	9.91	10.33	9.74	10.67
Ribeye area/cwt. carcass, sq. in.	1.7	1.9	1.9	1.7	1.8	1.8
Marbling score ³	6.7	6.5	6.9	6.2	7.0	6.1
Color of fat ⁴	2.1	2.1	2.0	2.1	2.1	2.0
Color of lean ⁵	1.4	1.6	1.5	1.5	1.5	1.5
Firmness of lean ⁶	1.5	1.6	1.6	1.5	1.4	1.4
Hide yield, %	7.6	8.3	8.6	7.3	7.7	8.2

1. 11 = Good+, 12 = Choice-, 13 = Choice

2. Six-hour shrunk weight (3-hour haul) and 72-hour cold weight

3. 6 = Modest, 7 = Moderate

4. 1 = White, 2 = Creamy white, 3 = Yellowish tinge

5. Munsell color paddles - the smaller the number the lighter the color

6. 1 = Firm, 2 = Slightly firm

PERFORMANCE OF COW HERDS. 1960 CALVES

Kentucky Station

Location	Mercer	Mercer
Breed of sire	Hereford	Hereford
Breed of dam	Hereford	Red Poll

No. cows calving	19	20
No. calves raised	18	18

Av. birth date	1/13/60	1/9/60
Av. birth wt. (lbs.)	68	75
Av. weaning age	270 days	274 days
Av. weaning wt.	475 lbs.	604 lbs.
Av. weaning type score	10.6	9.9
Were calves creep fed?	No	No
Adjusted ⁽¹⁾ av. daily gain from birth to weaning	1.68	2.10

⁽¹⁾ Age of dam, sex of calf, season of birth.

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
(or pastured for high gains)

Location	Coldstream	Coldstream
Breed of sire	Hereford	Hereford
Breed of dam	Hereford	Red Poll

STEERS, No.	7	8
Av. initial age (days)	269	262
Av. initial wt. (lbs.)	449	577
Av. no. days on feed	207	207
Av. final weight	952	1096
Av. daily gain	2.43	2.51
Av. feed per day	18.1	21.4
Concentrates	14.5	17.1
Roughage	3.6	4.3
Feeding regime	Self-fed	Self-fed

HEIFERS, No.	10	9
Av. initial age (days)	263	269
Av. initial wt. (lbs.)	448	548
Av. no. days on feed	207	207
Av. final weight	908	972
Av. daily gain	2.22	2.05
Av. feed per day	18.5	19.8
Concentrates	15.0	15.8
Roughage	3.5	4.0
Feeding regime	Self-fed	Self-fed

DATA ON ANIMALS SLAUGHTERED

Kentucky Station

Location	Mercer	Mercer
Breed of sire	Hereford	Hereford
Breed of dam	Hereford	Red Poll
Sex	7 steers 10 heifers	8 steers 9 heifers
No. slaughtered	17	17
Age at slaughter	16 mos.	16 mos.
Time in feedlot (days)	207	207
Gain in feedlot (lbs.)	477	468
Final feedlot weight	926	1030
Slaughter weight ⁽¹⁾	870	968
Carcass weight ⁽²⁾	548	609
Dressing percentage	62.0	61.7
Slaughter grade	11.3	11.2
Carcass grade	12.2	11.7
Fat thickness over rib eye (ins.)	.76	.84
Rib eye area (sq.in.)	9.91	10.33
9-10-11 Rib section		
Weight in lbs.	11.0	11.8
% fat	40.9	42.9
% lean	45.7	43.2
% bone	13.2	13.2

(1) 22 hours elapsed, 3-hour haul, stood overnight in drylot with access to water only.

(2) 72-hour cold weight.

(3) 6-hour shrunk weight and 72-hour cold weight.

Lousiana Station
Baton Rouge, Louisiana

by

R. S. Temple

I. PROJECT: Animal Industry 605 (S-10)

Comparison of various Crossbred Cattle Under Gulf Coast Conditions with Respect to Rate of Growth an Pasture, Fattening Ability, and Meat Quality of Steers.

II. OBJECTIVES:

- A. To study types and breeds of beef cattle to determine which are best suited to conditions along the Gulf Coast, with respect to rate of growth, fattening ability and meat quality.
- B. To study various crossbreeding programs as to practicality, production and usefulness.
- C. To study the amount of hybrid vigor obtained through crossing beef breeds and to ascertain how much of this hybrid vigor is maintained through subsequent backcrossing, multiple breed crossing and rotational crossing.
- D. To study the productive ability of dams of various breeds and crosses.
- E. To estimate genetic parameters
- F. To study practical problems of management and marketing of crossbred cattle in the Gulf Coast area.

III. PERSONNEL:

R. S. Temple, S. H. Fowler, S. E. McCraine, G. L. Robertson, R. F. Boulware, A. M. Mullins, J. B. Francioni, Jr., J. S. Sullivan, Chester Phillips, C. L. Seger and D. Wilson

IV. ACCOMPLISHMENTS DURING THE YEAR:

A. Facilities and Animals

Nine bull pens have been built. Each pen will accomodate two bulls. A set of working pens have been added to our existing corrals.

Additional bulls secured for use this year include two Brangus bulls from Jeanerette; one Hereford bull from LSU at Alexandria, La.; One Shorthorn bull from the Front Royal, Virginia Station; two Charolais bulls on loan from H. M. Kimball at Maringouin, La.; and one Charolais bull given to LSU by Mr. Harl Thomas of Raymondville, Texas. Other bulls to be used this year are from the pure-bred beef herds at LSU.

A bull calf of each breed (Angus, Brahman, Brangus, Charolais, Hereford, Shorthorn) was purchased this past fall and put on a performance test. The calves were all from 8 - 12 months of age and selected to be about average Choice in grade. They will be used in the crossbreeding project when they reach two years of age.

B. Research Results.

The third year of the backcross phase has been completed. The last set of steers of this phase completed their post-weaning trial on April 19, 1961. These results are not completed as yet. The calving percentages, daily gain, and grades are shown in Table 1. The results of the post-weaning feed test for 1958, 1959 are shown in Table 2. The figures reported in these two tables are means and not constants. Statistics have not been completed.

The benefit of having some Brahman breeding in the cow is evident from the daily gains up to weaning. However, it appears that this advantage is probably lost in a post-weaning gain period.

The project revision was started in the breeding season of 1960 and the first calf crop is now on the ground. The 90-day breeding season was changed to begin April 15 rather than April 1. The herds are kept separate during breeding season but are put together after breeding season. A policy of dehorning and castrating at birth was adopted this year.

Adjustment factors for age of calf, age of dam and sex of calf were estimated by fitting constants. These will be used in the future for adjusting our weaning weights to 205 days of age. Under our conditions it appears that little or no adjustment is necessary for calves from 7-year-old or older cows. Calves from 3-year-old cows were approximately 30 pounds lighter at 205 days of age than calves from 7-year-old cows and calves from 4-, 5-, and 6-year-old cows were, on the average, about 10 pounds lighter than calves from 7-year-old cows. Steer calves average about 16 pounds heavier at weaning time than heifers while the weight per day of age at an average of 208 days of age was 1.92 pounds. Adjustment factors were also calculated for average ages of 180, 236, and 250 days. These are shown in Table 3.

In 1958-59, a pilot experiment was conducted to study the effect of nutrition and breed on age of puberty. Three breeds of heifers were used -- Angus, Brahman, and Hereford. Eight heifers of each breed were used: four were on pasture during the summer months and the other four were fed four pounds of concentrate with free access to Bermuda and Dallis grass hay during the summer. During the winter all heifers were fed 5 pounds of concentrate with free access to grass hay. Vasectomized bulls were used to detect heat. The bulls' briskets were greased with green dye. The results of this experiment are shown in Table 4. These results show that the Angus averaged

Table 1. Number of Calves Born, % Calves Raised, Average Daily Gain and Grades of Calves by Breed Groups in 1958-59-60.

Breed of Sire Dam		No. Calves Born (8 cows bred/group)				% Calves Raised to Weaning				ADG (pounds)				Av. Feeder Grade *				Av. Slaughter Gr.*			
		3-yr.				3-yr.				3-yr.				3-yr.				3-yr.			
		1958	1959	1960	Total	1958	1959	1960	Av.	1958	1959	1960	Av.	1958	1959	1960	Av.	1958	1959	1960	Av.
A x A-Ba	3	4	6	13	38	50	75	54	1.3	1.5	1.7	1.6	11	12	10	11	9	11	9	10	10
A x A	4	-	1	5	50	-	12	21	1.2	-	1.4	1.2	9	-	10	9	8	-	8	8	8
A x A-A	5	4	5	14	62	50	62	58	1.3	1.4	1.6	1.4	10	12	9	10	9	10	8	8	9
A x A-B	3	5	5	13	38	62	62	54	1.5	2.0	1.9	1.8	12	13	11	12	12	11	10	10	11
Angus	15	13	17	45	47	41	53	47	1.3	1.7	1.7	1.6	10	13	10	11	9	11	9	9	10
B x B-Ba	7	7	7	21	88	88	88	88	1.6	1.6	1.7	1.6	11	12	10	11	10	9	9	9	9
B x B-A	4	7	3	14	50	88	38	58	1.6	1.6	1.7	1.6	12	12	11	12	11	9	10	10	10
B x B-H	6	7	7	20	75	88	88	83	1.7	1.8	1.8	1.8	12	13	10	12	11	10	9	10	10
B x B	4	3	1	8	50	38	12	33	1.4	1.5	1.9	1.5	11	12	10	11	9	9	8	9	9
Brahman	21	24	18	63	66	75	56	66	1.6	1.7	1.8	1.7	11	12	10	11	11	9	9	9	10
BA x BA	1	5	6	12	12	62	75	50	1.8	1.7	1.8	1.8	12	11	10	11	11	9	9	9	9
BA x BA-A	2	2	3	7	25	25	38	42	1.8	1.8	1.6	1.7	12	12	10	11	11	9	9	10	10
BA x BA-H	5	4	5	14	62	50	62	58	1.9	1.8	1.9	1.9	12	12	10	12	11	10	10	10	10
BA x BA-B	-	4	4	8	-	50	50	33	-	1.8	1.9	1.9	-	12	10	11	-	11	9	10	10
Brangus	8	15	18	41	25	47	56	46	1.8	1.8	1.8	1.8	12	12	10	11	11	10	9	9	10
C x C-Ba	1	8	7	16	12	100	88	67	1.9	1.7	1.9	1.8	12	12	10	11	11	9	9	9	9
C x C-A	4	8	4	16	50	100	50	67	1.8	1.4	1.7	1.6	12	11	9	11	10	9	8	9	9
C x C-H	1	6	6	13	12	75	75	54	1.5	1.6	1.9	1.7	11	12	11	11	10	10	9	9	9
C x C-B	4	5	4	13	50	62	50	54	2.2	1.8	2.3	2.1	12	12	12	12	10	10	9	9	10
Charolais	10	27	21	58	31	84	66	59	2.0	1.6	2.0	1.8	12	12	10	11	10	9	9	9	9
H x H-Ba	6	8	7	21	75	100	88	88	1.6	1.6	1.8	1.7	11	12	11	12	10	11	10	10	10
H x H-A	6	3	5	14	75	38	62	58	1.4	1.4	1.6	1.5	11	12	10	11	10	10	9	10	10
H x H	5	6	4	15	62	75	50	62	1.3	1.3	1.5	1.4	11	11	9	10	9	9	8	9	9
H x H-B	6	7	8	21	75	88	100	88	1.8	1.9	2.1	1.9	13	13	11	12	12	12	10	11	11
Hereford	23	24	24	71	72	75	75	75	1.6	1.6	1.8	1.7	12	12	11	11	10	11	10	10	10
S x S-Ba	5	5	6	16	62	62	75	67	1.5	1.4	1.7	1.5	11	13	10	11	10	11	9	10	10
S x S-A	4	7	6	17	50	88	75	71	1.1	1.2	1.3	1.2	10	11	9	10	8	9	8	9	9
S x S-H	6	7	6	19	75	88	75	79	1.1	1.4	1.6	1.4	11	12	9	11	10	10	9	10	10
S x S-B	7	7	7	21	88	88	88	88	1.6	1.6	1.9	1.7	13	13	11	12	11	11	10	11	11
Shorthorn	22	26	25	73	69	81	78	76	1.4	1.4	1.6	1.5	11	12	10	11	10	10	9	9	10

* Grades: 17-16-15 = Fancy or Prime; 14-13-12 = Choice; 11-10-9 = Good; 8-7-6 = Standard or Medium

Table 2. Carcass Traits for 1958 and 1959 Steers by Breed Groups

Breed of Sire Dam	No. Steers (8 cows bred in each group)		Daily Gain on feed		Carcass Grade		Shearing Strength		Rib-eye Area	
	2-yr.		2-yr.		2-yr.		2-yr.		2-yr.	
	1958	1959	1958	1959	1958	1959	1958	1959	1958	1959
A X A-BA	2	1	1.95	1.71	10.00	10.67	14.02	23.66	8.26	7.10
A X A	3	-	2.21	-	10.67	-	13.30	-	10.04	-
A X A-H	1	2	2.08	1.55	11.00	8.66	11.75	19.20	8.97	7.00
A X A-B	-	5	-	1.67	-	9.46	-	17.53	-	8.19
Angus	6	8	2.10	1.65	10.50	9.42	13.28	18.72	9.27	7.76
			7.0	1.84		9.88		16.39		8.41
B X B-BA	4	4	1.30	1.34	7.50	7.42	18.34	18.38	8.28	7.50
B X B-A	2	4	1.46	1.40	7.50	8.33	17.38	22.34	8.08	7.81
B X B-H	2	5	1.66	1.45	7.50	7.33	16.62	20.81	7.45	7.77
B X B	3	-	1.72	-	6.67	-	17.14	-	8.42	-
Brahman	11	15	1.51	1.40	7.27	7.67	17.52	20.53	8.13	7.70
			12.0	1.45		7.49		19.15		7.90
BA X BA	1	3	1.82	1.89	8.00	9.00	18.29	18.40	11.20	8.84
BA X BA-A	1	1	1.96	1.31	10.00	8.00	15.67	19.96	10.55	6.83
BA X BA-H	2	2	1.84	1.80	9.50	8.67	11.98	16.66	8.70	8.18
BA X BA-B	-	2	-	1.86	-	9.00	-	17.58	-	8.85
Brangus	4	8	1.86	1.79	9.25	8.79	14.48	17.96	9.79	8.43
			6.0	1.81		8.94		16.80		8.88
C X C-BA	1	7	2.53	1.59	9.00	6.62	10.29	19.10	10.47	9.30
C X C-A	3	3	2.53	1.69	9.67	5.44	17.85	18.48	10.33	8.08
C X C-H	1	2	1.99	1.73	6.00	8.50	19.50	17.10	11.45	9.33
C X C-B	2	2	2.17	1.62	6.50	7.67	15.94	26.00	10.00	9.64
Charolais	7	14	2.35	1.64	8.14	6.79	16.46	19.67	10.42	9.09
			10.5	1.88		7.24		18.6		9.53
H X H-BA	3	3	1.93	1.43	9.33	7.78	14.36	14.36	8.49	7.51
H X H-A	4	1	2.21	1.79	9.25	9.00	10.74	15.08	8.48	8.11
H X H	3	1	2.03	1.39	8.00	6.67	14.93	23.17	8.23	6.61
H X H-B	4	3	1.86	1.67	8.75	9.00	15.33	18.47	8.87	7.89
Hereford	14	8	2.01	1.57	8.86	8.25	13.73	17.09	8.54	7.62
			11.0	1.85		8.64		14.95		8.20
S X S-BA	2	2	2.23	1.48	10.50	9.67	20.40	18.94	8.20	8.54
S X S-A	2	3	1.90	1.68	9.50	9.00	13.44	28.34	7.60	7.04
S X S-H	3	2	1.72	1.84	10.00	9.83	20.60	14.24	8.17	8.36
S X S-B	2	3	1.85	1.55	8.50	9.33	20.38	20.15	8.25	8.42
Shorthorn	9	10	1.92	1.63	9.62	9.40	18.70	21.18	8.05	8.02
			9.5	1.77		9.50		20.00		8.03

Table 3. Adjustments for weights per day of age of calf,
age of dam and sex of calf for four average ages.

	Average Days of Age of Beef Calves			
	180	208	236	250
Weight per day of age up to indicated age	1.99 lb.	1.92 lb.	1.89 lb.	1.78 lb.
Age of Dam				
3 years - add	25 lbs.	30 lbs.	30 lbs.	35 lbs.
4, 5, 6 years	6	10	10	10
7 years and over	0	0	0	0
Sex of Calf				
Heifer - add	15 lbs.	16 lbs.	17 lbs.	23 lbs.
Steer	0	0	0	0

6

the earliest age at puberty (13.5 months), the Brahman were the oldest (23 months) and the Herefords were in between (17 months). The heifers on pasture came into heat earlier than the dry-lot heifers. The Hereford and Brahman heifers on pasture averaged about five months earlier at puberty than the heifers of the same breed on dry-lot. The difference between the pasture and dry-lot Angus heifers was not nearly so great (15 days).

Following this experiment, age at first heat was recorded on all of the 1959 heifers. The differences between breeds followed the previous pilot experiment closely. When the heifers averaged two years of age, the check was stopped whether they were in heat or not. However, even those that failed to come into heat were put into breeding herds, so further check can be made on them. The average ages of the various breeds and crosses are shown in Table 5. These data make it appear that age at first heat is additive, in that the cross was almost always intermediate between the two parents.

The use of artificial insemination was tried on an experimental basis during the 1960 breeding season. In four herds, comprised of 105 cows, only 59% of the cows were found in heat in a 45-day period. Stags or vasectomized bulls were run with the cows to aid in heat detection. During this 45-day period, only 17 (16%) were settled. Two of the four herds were mated artifically, while the remaining two herds were hand mated to a bull after heat was recognized. These results are shown in Table 6. In four other herds (94 cows) that were pasture mated to a bull, 46 cows (49%) were settled in the same 45-day period. There appeared to be little difference in fertilization rate between those mated artifically and those hand mated to a bull. After the first 45 days of breeding season all cows were allowed to be pasture mated. The presence of Brahman breeding appeared to have little effect on the detection of heat.

Table 4. Age at Puberty of Angus, Hereford and Brahman Heifers on Pasture Versus Dry Lot.

Group	Angus			Hereford			Brahman		
	No. of Heifers	Wt. at 1st Heat	Age at 1st Heat	* Heifers	Wt. at 1st Heat	Age at 1st Heat	* Heifers	Wt. at 1st Heat	Age at 1st Heat
Pasture	4	475	395	4	479	456	2	690	645
Dry Lot	4	486	411	3	570	594	1	775	783
Breed av.	8	481	403	7	518	515	3	718	691

*One Hereford and three Brahman failed to come into heat during the experiment. The Hereford was 801 days of age and Brahman averaged 783 days of age at the end of the experiment.

Table 5. Age at Puberty of Straightbred and Crossbred Heifers

Breed	No. of Heifers	Av. Age at 1st Heat
Angus	3	378.3
Brahman	5	589.6
Brahman	5	---*
Brangus	2	584.0
Hereford	9	481.3
A x A-BA	3	477.0
A x A-H	2	423.0
B x B-BA	2	531.0
B x B-BA	1	---*
B x B-A	2	578.0
B x B-A	1	---*
B x B-H	1	571.0
B x B-H	1	---*
BA x BA-A	1	407.0
BA x BA-H	2	419.0
BA x BA-B	2	492.5
C x C-BA	1	486.0
C x C-A	5	495.2
C x C-H	4	488.0
C x C-H	1	---*
C x C-B	3	506.0
H x H-BA	6	473.5
H x H-A	3	470.7
H x H-B	5	439.8
S x S-BA	3	440.0
S x S-A	4	401.0
S x S-H	5	440.4
S x S-B	4	413.8

* These heifers had not come into heat by April 10, 1960.

Table 6. Breeding Record of Cows Mated Naturally, Artificially Inseminated or Pasture Mated

Herd designation	7	8	11	12	9	10	3	4
Sire	Charolais 17	Charolais 17	Shorthorn W-2	Shorthorn W-2	Hereford 340	Hereford 72	Brahman 263	Brahman 411
Breeding program	Artificial Insemination	Hand Mated	Artificial Insemination	Hand Mated	Pature Mated	Pasture Mated	Pasture Mated	Pasture Mated
Number in group	26	27	26	25	23	23	24	24
Number bred in first 45 days of breeding season*	1	4	8	4	10	13	12	11
Number palpated open	8	4	11	11	8	7	7	5
Number in which heat was recognized in the first 45 days of breeding season	12	17	16	16	--	--	--	--
Fraction of cows with Brahman breeding in which heat was recognized	8/17	11/18	11/17	12/17	--	--	--	--
Fraction of cows with no Brahman breeding in which heat was recognized	4/9	6/9	5/9	4/8	--	--	--	--
Number bred in last 45 days of breeding season*	17	19	7	10	5	3	5	8

LA (7)

* In herds 7, 8, 11 and 12, heat was checked during the first 45 days of breeding season and cows were either hand mated or artificially inseminated. Cows were allowed to run with the bull during the last 45 days of breeding season.

Vibrio fetus was isolated from some of the open cows at palpation time. The organism was isolated from open cows in three of the twelve breeding units. The percentage of cows pregnant in herds from which the disease was not isolated was 73% as compared to 61% in the herds in which vibriosis was diagnosed. The calving percentages of the different age groups are shown in Table 7. It appears that two-year-old cows are more effected by vibriosis than older cows.

A double muscled Angus bull was mated to 19 cows that are either double muscled or were sired by a double muscled bull. Of five cows that exhibit the trait severely, two were open, one had a live calf that exhibited the trait but died soon after birth and two had calves that were severe in the trait. Five cows showed moderate degrees of the trait; of these two were open, one had a calf that died at birth which exhibited the trait, one had a calf that exhibited the trait and also had flexed pasterns, front and rear, as well, and evidenced of hydrocephalus (this calf died at three weeks of age); and one cow had a calf that showed moderate degrees of the trait. Nine cows exhibited little or no evidence of the trait. Of these, four were open, four had calves that show slight degrees of the trait, and one showed severe evidence of the trait. It appears that the trait is not inherited as a simple recessive, but could be inherited as either a dominant or incomplete dominant.

Table 7. Pregnancy of Cows in Crossbreeding Project by Age Groups in *Vibrio* Positive and Negative herds

Age groups	2 yr.	3 yr.	4 yr.	5 yr.	6 yr.	7 yr.	8-13 yr.
<i>Vibrio</i> positive herds Av. = 60.9%	41% (9/22)	70% (16/23)	57% (4/7)	60% (9/15)	64% (7/11)	80% (4/5)	88% (7/8)
<i>Vibrio</i> negative herds Av. = 72.6%	81% (34/42)	62% (21/34)	86% (25/29)	70% (23/33)	82% (31/38)	69% (20/29)	76% (22/29)
Total herd Av. = 70.1%	(43/66)	(37/57)	(29/36)	(32/48)	(38/49)	(24/34)	(29/37)

IV. FUTURE PLANS:

- A. Continue the breeding plan to obtain single crosses, backcrosses, three-breed crosses and straightbreds in a single year.
- B. Continue obtaining prospective sires as calves and putting them on a performance test.
- C. Continue obtaining pre-weaning data as planned in the revision.

D. It is hoped and planned that a steer feeding shed will be available so that steers can be fed in groups. This will make available feed efficiency information on breed groups.

E. Heifers raised in the future will serve as replacements for the main breeding herd.

V. PUBLICATIONS DURING THE YEAR:

Temple, R. S. The adaptability of Various Breeds and Crosses for Beef Production under Gulf Coast Conditions. 1960. Animal Industry Reports.

Crown, R. M. and R. A. Damon, Jr. The Value of the 12th Rib Cut for Measuring Beef Carcass Yields and Meat Quality. J. Animal Sci., Vol. 19, No. 1, February, 1960.

Damon, R.A., Jr., R. M. Crown, C. B. Singletary and S. E. McCrairie. Carcass Characteristics of Purebred and Crossbred Beef Steers in the Gulf Coast Region. J. Animal Sci., Vol. 19, No. 3, August, 1960.

Temple, R. S., S. H. Fowler, A. M. Mullins and George L. Robertson. Crossbreeding Beef Cattle. Louisiana Agriculture, Vol. 3, No. 2, Winter 1960.

Temple, R. S. and John S. Sullivan. Factors Which Affect the Weaning Weight and Grade of Louisiana Beef Calves. A.I. Mimeo. Cir. 60-14, November, 1960.

Temple, Robert S. Charolais in Crossbreeding. A. I. Mimeo. Cir. 60-15, November, 1960.

Sullivan, John S. Estimates of Some Factors Which Affect Weights and Grades of Calves in the Gulf Coast Area. Master's thesis. Louisiana State University. 1961.

VI. PUBLICATIONS PLANNED:

Temple, Robert S. A Review of Crossbreeding at L.S.U., La. Agri. Exp. Sta. Bul.

Temple, Robert S. Further Studies in Growth Rate and Grades of Back-cross and Straightbred Calves.

Sullivan, J. S. and R. S. Temple. Estimates of Environmental Factors that Effect Growth Rate and Grade of Straightbred and Crossbred Calves at Four Average Ages.

PERFORMANCE OF COW HERDS: 1960 CALVES

BREED GROUPS

Louisiana Station

Location	Baton Rouge Angus A-BA	Baton Rouge Angus A-H	Baton Rouge Angus A-B	Baton Rouge Brahman B-BA	Baton Rouge Brahman B-A	Baton Rouge Brahman B-H
Breed of sire						
Breed of dam						
No. cows calving	6	5	5	7	7 ⁽¹⁾	7
No. calves raised	6	5	5	7	3	7
Av. birth date						
Av. birth wt. (lbs.)	2-12-60 68.7	2-18-60 64.0	1-30-60 64.8	2-22-60 69.6	2-16-60 62.3	2-12-60 69.9
Av. weaning age	250.0	244.2	262.6	240.3	239.7	250.3
Av. weaning wt.	504.2	442.0	560.0	479.3	471.7	521.4
Av. weaning type score	10.25	8.90	11.00	10.07	10.83	10.43
Av. weaning condition score	9.17	8.10	9.80	8.71	9.83	9.21
Were calves creep fed?	No	No	No	No	No	No
Adjusted ⁽²⁾ av. daily gain from birth to weaning (180 days)	2.25	1.99	2.09	2.11	2.38	2.31

(1) Twin calves in this group. One calf in this group not counted on project - sired by bull of

(2) Different breed.

Adjusted for age of dam and sex of calf.

Scores: Prime 17-16-15; Choice 14-13-12; Good 11-10-9; Standard 8-7-6; Utility 5-4-3; Common 2-1-0.

BREED GROUPS

PERFORMANCE OF COW HERDS. 1960 CALVES

Louisiana Station

Location	Baton Rouge Brahman Brahman	Baton Rouge Brangus Brangus	Baton Rouge Brangus BA-A	Baton Rouge Brangus BA-H	Baton Rouge Brangus BA-B	Baton Rouge Charolais C-BA	Baton Rouge Charolais C-A
Breed of sire							
Breed of dam							
No. cows calving	(1) 4	6	3	6	5 ⁽¹⁾	7	5
No. calves raised	1	6	3	5	4	7	4
Av. birth date	2-19-60	3-5-60	2-5-60	3-4-60	3-22-60	2-28-60	2-9-60
Av. birth wt. (lbs.)	61.7	65.0	68.7	65.0	61.0	89.9	82.2
Av. weaning age	198.0	228.2	256.7	238.0	210.8	234.3	250.0
Av. weaning wt.	440.0	475.0	473.3	524.0	465.0	539.3	516.2
Av. weaning type score	9.50	10.25	10.00	10.50	10.38	10.00	9.38
Av. weaning condition score	8.50	9.17	9.00	9.50	9.12	8.71	8.00
Were calves creep fed?	No	No	No	No	No	No	No
Adjusted av. daily gain from (2) birth to weaning (180 days)	2.34	2.39	2.30	2.50	2.43	2.52	2.26

(1) One calf in this group not counted on project - sired by bull of different breed.
 (2) Adjusted for age of dam and sex of calf.

Scores: Prime 17-16-15; Choice 14-13-12; Good 11-10-9; Standard 8-7-6; Utility 5-4-3; Common 2-1-0.

BREED GROUPS

PERFORMANCE OF COW HERDS. 1960 CALVES

Louisiana Station

Location	Baton Rouge Charolais C-H	Baton Rouge Charolais C-B	Baton Rouge Hereford H-BA	Baton Rouge Hereford H-A	Baton Rouge Hereford Hereford	Baton Rouge Hereford H-B	Baton Rouge Shorthorn S-BA
Breed of sire							
Breed of dam							
No. cows calving	7	4	8	5	4	9 ⁽¹⁾	6
No. calves raised	6	4	7	5	4	9	6
Av. birth date	3-6-60	2-14-60	2-19-60	2-14-60	3-6-60	2-24-60	2-19-60
Av. birth wt. (lbs.)	93.7	89.0	80.0	72.8	81.5	79.6	69.2
Av. weaning age	224.2	248.0	246.4	247.6	227.5	243.0	263.2
Av. weaning wt.	520.8	647.5	517.1	474.0	431.2	577.5	471.7
Av. weaning type score	10.67	11.50	10.93	10.20	9.25	11.06	10.00
Av. weaning condition score	9.17	9.33	9.79	9.30	8.38	9.94	8.83
Were calves creep fed?	No	No	No	No	No	No	No
Adjusted ⁽²⁾ av. daily gain from birth to weaning (180 days)	2.57	2.96	2.40	2.16	2.17	2.74	2.12

(1) Twin calves in this group.

(2) Adjusted for age of dam and sex of calf.

Scores: Prime 17-16-15; Choice 14-13-12; Good 11-10-9; Standard 8-7-6; Utility 5-4-3; Common 2-1-0.

PERFORMANCE OF COW HERDS. 1960 CALVES

Breed Groups

Louisiana Station

Location Breed of sire Breed of dam	Baton Rouge Shorthorn S-A	Baton Rouge Shorthorn S-H	Baton Rouge Shorthorn S-B
No.cows calving No. calves raised	6 6	8 6	7 7
Av. birth date Av. birth wt. (lbs.)	1-30-60 64.8	2-3-60 73.1	2-6-60 69.7
Av. weaning age Av. weaning wt.	263.2 418.3	261.8 495.0	256.1 556.4
Av. weaning type score Av. weaning condition score	9.08 8.25	9.25 8.75	11.21 10.21
Were calves creep fed?	No	No	No
Adjusted ⁽¹⁾ av. daily gain from birth to weaning (180 days)	1.78	1.99	2.39

(1) Adjusted for age of dam and sex of calf.

Scores: Prime 17-16-15; Choice 14-13-12; Good 11-10-9; Standard 8-7-6; Utility 5-4-3; Common 2-1-0.

PERFORMANCE OF COW HERDS. 1960 CALVES

SIRE GROUPS

Louisiana Station

Location Breed or sire Breed of dam	Baton Rouge Angus A-X	Baton Rouge Brahman B-X	Baton Rouge Brangus BA-X	Baton Rouge Charolais C-X	Baton Rouge Hereford H-X	Baton Rouge Shorthorn S-X
No. cows calving	17	23	19	23	26	27
No. calves raised	17	18	18	21	25	25
Av. birth date	2-14-60	2-17-60	3-4-60	2-24-60	2-22-60	2-6-60
Av. birth wt. (lbs.)	67.1	66.7	64.7	89.2	78.7	69.5
Av. weaning age	248.4	241.7	231.8	237.0	239.7	256.0
Av. weaning wt.	492.6	492.2	486.1	550.2	514.0	488.2
Av. weaning type score	10.03	10.31	10.31	10.30	10.54	9.94
Av. weaning condition score	9.00	9.08	9.22	8.80	9.50	9.06
Were calves creep fed?	No	No	No	No	No	No
Adjusted ⁽¹⁾ av. daily gain from birth to weaning (180 days)	2.26	2.25	2.41	2.57	2.42	2.09

(1) Adjusted for age of dam and sex of calf.

Scores: Prime 15-16-17; Choice 12-13-14; Good 9-10-11; Standard 6-7-8; Utility 3-4-5;
Common 0-1-2.

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER
WEANING (or pastured for high gains)

BREED GROUPS

Louisiana Station

Location	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire	Angus	Angus	Angus	Brahman
Breed of dam	A-BA	A-H	A-B	B-BA
STEERS, No.	1	2	5	4
Av. Initial age (days)	263.0	262.0	248.6	239.5
Av. initial wt. (lbs.)	420.0	417.5	474.0	411.2
Av. no. days on feed	168	168	168	168
Av. final weight	708.0	677.5	755.4	636.8
Av. daily gain	1.71	1.55	1.67	1.34
Av. score				
Conformation	L-Choice	L-Choice	Choice	L-Choice
Condition	H-Good	Good	H-Good	L-Good
Av. feed per day ⁽¹⁾				
Location	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire	Brahman	Brahman	Brangus	Brangus
Breed of dam	B-A	B-H	Brangus	BA-A
STEERS, No.	4	5	3	1
Av. initial age (days)	262.0	249.8	268.3	188.0
Av. initial wt. (lbs.)	438.8	464.0	535.0	350.0
Av. no. days on feed	168	168	168	168
Av. final weight	673.2	707.8	852.0	570.0
Av. daily gain	1.40	1.45	1.89	1.31
Av. score				
Conformation	L-Choice	L-Choice	H-Good	H-Good
Condition	L-Good	L-Good	L-Good	L-Good
Av. feed per day ⁽¹⁾				
Location	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire	Shorthorn	Shorthorn	Shorthorn	Shorthorn
Breed of dam	S-BA	S-A	S-H	S-B
STEERS, No.	2	3	2	3
Av. initial age (days)	268.5	268.7	280.5	281.3
Av. initial wt. (lbs.)	435.0	373.3	442.5	486.7
Av. no. days on feed	168	168	168	168
Av. final weight	684.0	656.0	751.0	747.3
Av. daily gain	1.48	1.68	1.84	1.55
Av. score				
Conformation	Choice	Good	H-Good	L-Choice
Condition	H-Good	H-Standard	Good	Good
Av. feed per day ⁽¹⁾				

(1) Steers hand fed 8 lb. per head per day of concentrate ration consisting of 5 parts corn, 1 part CS meal, 2 parts oats, 1 part SO meal and 1 part bran. Oats and rye grass pasture - free choice.

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
(or pastured for high gains)

BREED GROUPS

Louisiana Station

Location	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire	Brangus	Brangus	Charolais	Charolais	Charolais
Breed of dam	BA-H	BA-B	C-BA	C-A	C-H
STEERS, No.	2	2	7	3	2
Av. initial age (days)	243.0	251.0	263.0	257.3	278.5
Av. initial wt. (lbs.)	412.5	497.5	476.4	361.7	507.5
Av. no. days on feed	168	168	168	168	168
Av. final weight	715.0	810.5	742.7	646.0	795.5
Av. daily gain	1.80	1.86	1.59	1.69	1.73
Av. score					
Conformation	H-Good	L-Choice	L-Choice	Good	Choice
Condition	H-Standard	H-Good	L-Good	Standard	L-Good
Av. feed per day ⁽¹⁾					
Location	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire	Charolais	Hereford	Hereford	Hereford	Hereford
Breed of dam	C-B	H-BA	H-A	Hereford	H-B
STEERS, No.	2	3	1	1	3
Av. initial age (days)	257.5	260.0	198.0	269.0	270.7
Av. initial wt. (lbs.)	515.0	425.0	365.0	345.0	560.0
Av. no. days on feed	168	168	168	168	168
Av. final weight	787.5	665.0	665.0	578.0	844.3
Av. daily gain	1.62	1.43	1.79	1.39	1.69
Av. score					
Conformation	H-Good	L-Choice	L-Choice	Good	Choice
Condition	L-Good	Good	Good	H-Standard	H-Good
Av. feed per day ⁽¹⁾					

(1) Steers hand fed 8 lb. per head per day of concentrate ration consisting of 5 parts corn, 1 part CS meal, 2 parts oats, 1 part SO meal and 1 part bran. Oats and rye grass pasture - free choice.

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
(or pastured for high gains)

SIRE GROUPS

Louisiana Station

Location Breed of sire Breed of dam	Baton Rouge Angus A-X	Baton Rouge Brahman B-X	Baton Rouge Brangus BA-X	Baton Rouge Charolais C-X	Baton Rouge Hereford H-X	Baton Rouge Shorthorn S-X
STEERS, No.	8	13	8	14	8	10
Av. initial age (days)	253.8	250.4	247.6	263.2	257.4	274.8
Av. initial wt. (lbs.)	453.1	440.0	471.9	461.8	458.1	433.5
Av. no. days on feed	168	168	168	168	168	168
Av. final weight	730.0	675.3	772.1	736.2	721.4	708.0
Av. daily gain	1.65	1.40	1.79	1.64	1.57	1.63
Av. score						
Conformation	Choice	L-Choice	H-Good	H-Good	L-Choice	L-Choice
Condition	H-Good	L-Good	L-Good	L-Good	Good	Good
Av. feed per day(1)						

(1) Steers hand fed 8 lb. per head per day of concentrate ration consisting of 5 parts corn, 1 part CS meal, 2 parts oats, 1 part SO meal and 1 part bran, Oats and rye grass pasture-free choice.

DATA ON ANIMALS SLAUGHTERED

Louisiana Station

Location	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of Sire	Angus	Angus	Angus	Brahman
Breed of Dam	A-BA	A-H	A-B	B-BA
Sex	Male	Male	Male	Male
No. slaughtered	1	2	5	4
Age at slaughter	431.0	430.0	416.6	407.5
Time in feedlot (days)	168	168	168	168
Gain in feedlot (lbs.)	1.71	1.55	1.67	1.34
Final feedlot weight	708.0	677.5	755.4	636.8
Slaughter weight ⁽¹⁾	708.0	677.5	755.4	636.8
Carcass weight ⁽²⁾	423.0	376.5	435.4	386.0
Dressing percentage ⁽³⁾	59.75	55.58	57.64	60.62
Slaughter grade	Good	L-Good	L-Good	H-Standard
Carcass grade	H-Good	L-Good	L-Good	Standard
Fat thickness over rib eye (ins.)	1.53	0.83	1.27	0.36
Rib eye area (sq.in.)	7.10	7.00	8.19	7.50
W-B Shear				
Core size	1 in.	1 in.	1 in.	1 in.
Shear Force (lbs.)	23.66	19.20	17.53	18.38
9-10-11 Rib Section				
Weight in lbs.	6.3	5.3	6.4	5.3
% fat	36.28	27.48	29.11	18.78
% lean	47.19	53.94	52.00	58.85
% bone	16.53	18.56	18.89	22.37

(1) Final weight taken on day of slaughter.

(2) Cold carcass weight.

(3) Live slaughter weight and cold carcass weight.

LA (19)
DATA ON ANIMALS SLAUGHTERED
Louisiana Station

Location	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire	Brangus	Brangus	Charolais	Charolais	Charolais
Breed of dam	BA-H	BA-H	C-BA	C-A	C-H
Sex	Male	Male	Male	Male	Male
No. slaughtered	2	2	7	3	2
Age at slaughter	411.0	419.0	431.0	425.3	446.5
Time in feedlot (days)	168	168	168	168	168
Gain in feedlot (lbs.)	1.80	1.86	1.59	1.69	1.73
Final feedlot weight	715.0	810.5	742.7	646.0	797.5
Slaughter weight ⁽¹⁾	715.0	810.5	742.7	646.0	797.5
Carcass weight ⁽²⁾	421.0	476.5	445.4	378.7	476.5
Dressing percentage ⁽³⁾	58.90	58.71	59.94	58.62	59.77
Slaughter grade	H-Standard	L-Good	H-Standard	H-Standard	L-Good
Carcass grade	L-Good	L-Good	Standard	H-Utility	H-Standard
Fat thickness over rib eye (ins.)	0.97	0.73	0.42	0.55	0.78
Rib eye area (sq.in.)	8.18	8.85	9.30	8.08	9.33
W-B Shear					
Core size	1 in.	1 in.	1 in.	1 in.	1 in.
Shear Force (lbs.)	16.66	17.58	19.10	18.48	17.10
9-10-11 Rib Section					
Weight in lbs.	6.4	6.7	6.7	5.5	7.4
% fat	26.15	24.02	15.62	12.71	21.77
% lean	54.57	57.66	62.74	65.11	61.18
% bone	19.28	18.32	21.64	22.18	17.06

- (1) Final weight taken on day of slaughter
(2) Cold carcass weight.
(3) Live slaughter weight and cold carcass weight.

DATA ON ANIMALS SLAUGHTERED

Louisiana Station

Location	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire	Brahman	Brahman	Brangus	Brangus
Breed of dam	B-A	B-H	Brangus	BA-A
Sex	Male	Male	Male	Male
No. slaughtered	4	5	3	1
Age at slaughter	430.0	417.8	436.3	356.0
Time in feedlot (days)	168	168	168	168
Gain in feedlot (lbs.)	1.40	1.45	1.89	1.31
Final feedlot weight	673.2	707.8	852.0	570.0
Slaughter weight ⁽¹⁾	673.2	707.8	852.0	570.0
Carcass weight ⁽²⁾	409.5	425.0	434.0	325.0
Dressing percentage ⁽³⁾	60.71	60.03	59.56	57.02
Slaughter grade	L-Good	H-Standard	H-Standard	H-Standard
Carcass grade	H-Standard	Standard	L-Good	H-Standard
Fat thickness over rib eye (ins.)	0.70	0.41	0.81	0.78
Rib eye area (sq.in.)	7.81	7.77	8.84	6.83
W-B Shear				
Core size	1 in.	1 in.	1 in.	1 in.
Shear Force (lbs.)	22.34	20.81	18.40	19.96
9-10-11 Rib Section				
Weight in lbs.	5.8	5.7	7.3	4.9
% fat	22.34	20.50	23.86	18.42
% lean	56.82	57.06	57.71	60.53
% bone	20.84	22.44	18.70	20.16

(1) Final weight taken on day of slaughter.

(2) Cold carcass weight.

(3) Live slaughter weight and cold carcass weight

LA (21)
DATA ON ANIMALS SLAUGHTERED

Louisiana Station

Location	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire	Charolais	Hereford	Hereford	Hereford	Hereford
Breed of dam	C-B	H-BA	H-A	Hereford	H-B
Sex	Male	Male	Male	Male	Male
No. slaughtered	2	3	1	1	3
Age at slaughter	425.5	428.0	366.0	437.0	438.7
Time in feedlot (days)	168	168	168	168	168
Gain in feedlot (lbs.)	1.62	1.43	1.79	1.39	1.69
Final feedlot weight	787.5	665.0	665.0	578.0	844.3
Slaughter weight	787.5	665.0	665.0	578.0	844.3
Carcass weight	472.5	372.3	390.0	320.0	485.3
Dressing percentage	60.02	55.89	58.65	55.36	57.41
Slaughter grade	H-Standard	H-Standard	Good	Standard	L-Good
Carcass grade	H-Standard	H-Standard	L-Good	Standard	L-Good
Fat thickness over rib eye (ins.)	0.40	0.97	1.00	0.63	0.99
Rib eye area (sq.in.)	9.64	7.51	8.11	6.61	7.89
W-B Shear					
Core size	1 in.	1 in.	1 in.	1 in.	1 in.
Shear Force (lbs.)	26.00	14.36	15.08	23.17	18.47
9-10-11 Rib Section					
Weight in lbs.	7.0	5.5	6.0	4.8	6.8
% fat	16.24	20.05	23.26	23.33	26.21
% lean	64.60	57.57	56.13	56.40	55.75
% bone	19.16	22.46	20.61	20.28	18.04

- (1) Final weight taken on day of slaughter.
 (2) Cold carcass weight.
 (3) Live slaughter weight and cold carcass weight.

DATA ON ANIMALS SLAUGHTERED

Louisiana Station

Location	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire	Shorthorn	Shorthorn	Shorthorn	Shorthorn
Breed of dam	S-BA	S-A	S-H	S-B
Sex	Male	Male	Male	Male
No. slaughtered	2	3	2	3
Age at slaughter	436.5	436.7	448.5	449.3
Time in feedlot (days)	168	168	168	168
Gain in feedlot (lbs.)	1.48	1.68	1.84	1.55
Final feedlot weight	684.0	656.0	751.0	747.3
Slaughter weight ⁽¹⁾	684.0	656.0	751.0	747.3
Carcass weight ⁽²⁾	418.5	372.0	443.5	453.0
Dressing percentage ⁽³⁾	61.18	56.68	59.04	60.57
Slaughter grade	H-Good	L-Good	L-Choice	L-Good
Carcass grade	Good	L-Good	Good	L-Good
Fat thickness over rib eye (ins.)	1.06	1.13	0.73	1.18
Rib eye area (sq.in.)	8.54	7.04	8.36	8.42
W-B Shear				
Core size	1 in.	1 in.	1 in.	1 in.
Shear Force (lbs.)	18.94	28.34	14.24	20.15
9-10-11 Rib Section				
Weight in lbs.	6.2	5.3	6.5	6.2
% fat	32.69	26.68	34.42	30.17
% lean	48.84	52.81	48.54	52.04
% bone	18.46	20.50	17.04	17.79

- (1) Final weight taken on day of slaughter.
 (2) Cold carcass weight.
 (3) Live slaughter weight and cold carcass weight.

DATA ON ANIMALS SLAUGHTERED

SIRE GROUPS

Louisiana Station

Location	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire	Angus	Brahman	Brangus	Charolais	Hereford	Baton Rouge
Breed of dam	A-X	B-X	BA-X	C-X	H-X	Shorthorn
Sex	Male	Male	Male	Male	Male	S-X
No. slaughtered	8	13	8	14	8	10
Age at slaughter	421.8	418.4	415.6	431.2	425.4	442.8
Time in feedlot (days)	168	168	168	168	168	168
Gain in feedlot (lbs.)	1.65	1.40	1.79	1.64	1.57	1.63
Final feedlot weight	730.0	675.3	772.1	736.2	721.4	708.0
Slaughter weight ⁽¹⁾	730.0	675.3	772.1	736.2	721.4	708.0
Carcass weight ⁽²⁾	419.1	408.2	427.8	439.4	410.4	419.9
Dressing percentage ⁽³⁾	57.39	60.42	58.86	59.64	56.74	59.22
Slaughter grade	L-Good	H-Standard	H-Standard	H-Standard	H-Standard	Good
Carcass grade	L-Good	H-Standard	L-Good	Standard	H-Standard	L-Good
Fat thickness over rib eye (ins.)	1.19	0.48	0.83	0.50	0.94	1.12
Rib eye area (sq.in.)	7.76	7.70	8.43	9.09	7.62	8.02
W-B Sharr	1 in.	1 in.	1 in.	1 in.	1 in.	1 in.
Core size	18.72	20.53	17.96	19.67	17.09	21.18
Shear force (lbs.)	6.1	5.6	6.6	6.6	5.8	6.0
9-10-11 Rib Section	29.60	20.54	23.79	15.96	22.74	30.48
Weight in lbs.	51.88	57.54	57.26	63.29	56.68	50.93
% fat	18.52	21.92	18.94	20.75	20.62	18.59
% lean						
% bone						

(1) Final weight taken on day of slaughter.

(2) Cold carcass weight.

(3) Live slaughter wt. and cold carcass wt.

Jeanerette, Louisiana Station

by

T. M. DeRouen

I. PROJECT: AHRD dl-6 (S-10) (Revised)

Development of Pure and Crossbred Types of Beef Cattle for Southeastern United States and The Gulf Coast Region.

II. OBJECTIVES:

- A. To evaluate strains of Brahman-Angus and Africander-Angus in comparison with straight Angus and straight Brahman.
- B. To assess the progress made with crossbred strains of Brahman-Angus by comparing them to first crosses of the two pure breeds.
- C. To explore the use and value of Sindhi (Zebu dairy type) cattle by crossing the cows with Angus and Brahman bulls and also by mating Sindhi bulls to sample of Brahman-Angus and Africander-Angus cows.
- D. To study and evaluate carcass quality and merit of the steers and heifers from the various crossbred strains, purebreds and other crosses.
- E. To study fertility among the several breed groups under normal management procedures at the station.
- F. To evaluate the combining ability of purebred Angus, Brahman and Sindhi bulls on random samples of Brahman-Angus cows and Africander-Angus cows.

III. PERSONNEL:

Iberia Livestock Experiment Station, Jeanerette, Louisiana: T. M. DeRouen, Assistant Professor; M. W. Hazen, Animal Husbandman (Retired August 31, 1960); S. L. Cathcart, Superintendent; W. L. Reynolds, Animal Husbandman. C. M. Kincaid, Regional Coordinator, University of Tennessee, Knoxville 16, Tennessee.
Louisiana State University, Baton Rouge, Louisiana: R. S. Temple, Associate Professor; A. M. Mullins, Associate Professor; R. M. Bouleware, Assistant Professor.

IV. ACCOMPLISHMENTS DURING THE YEAR:

Research:

- A. A total of 286 cows were put in the breeding herds in the spring of 1959. These cows were sorted into 15 breeding herds for pasture mating. Bulls were put in the pasture with their respective herds on April 1 and were removed on June 15. The breeding season lasted 75 days. All females exposed to bulls during the breeding season were palpated in September to determine pregnancy.

The schedule on Performance of Cow Herds, for 1960 calves gives information obtained on weights, scores and growth rate of calves from the several combinations of matings.

- B. Selection of bull calves to be used for replacement and to be placed on the gain-evaluation test was made in the fall at weaning. They were fed for 140 days. Twenty bulls were selected. There were 7 Africander-Angus, 11 Brahman-Angus and 2 Angus. The calves were fed ad lib in individual pens. Feed efficiency was extremely high for the two Angus bulls.
- C. The Performance of steer calves born in early 1959, was studied. After weaning in the fall of 1959, the calves were castrated, branded with a hot iron and placed on pasture. During winter and early spring, the steers received approximately five pounds of concentrates on pasture (5 parts corn and 1 part cottonseed meal) per head daily.

The steers were placed on official full feed of concentrates on pasture on April 5, 1960. The duration of the feed period was 168 days. The concentrate ration was the same as used during winter. The F_1 crossbred steers made the largest daily gains followed by the Brahman-Angus, Africander-Angus, Angus and Angus-Sindhi steers, which had essentially the same daily gains. The one straight Brahman steer and the Sindhi steer made the least gains. The Angus steers had the highest condition score and they were followed by the F_1 crossbred and the Angus-Sindhi steers. The Africander-Angus, Brahman-Angus, Brahman and Sindhi steers had about the same degree of fatness but they ranked lower than the other groups.

- D. Slaughter and Carcass data on the steers is summarized in the table on Data on Animals Slaughtered. The F_1 steers had the largest rib-eye area which is probably due to their larger size. Fat thickness over the rib-eye area was larger for the F_1 steers. Carcass and slaughter grades of the purebred Angus, the F_1 crossbred and the Angus-Sindhi steers was similar. Brahman-Angus and Africander-Angus steers had about the same slaughter and carcass grades but they were lower than the other groups. There was less variation in shear values (tenderness) among the breed groups in the 1960 test than for the previous two years.
- E. The growth rate of the replacement heifers is summarized in the Table on Performance Data on Yearling or Older Cattle Not in Breeding Herds in 1959 and 1960. These heifers were weaned on October 6, 1959. During winter, the heifers were fed approximately 5 pounds of concentrates on pasture. Heifers were maintained entirely on pasture during late spring, summer and early fall.
- F. Daily heat checks have been conducted on all replacement heifers born in 1959 using infertile teaser bulls. Table I shows that Brahman heifers do not mature as early sexually as heifers of other breeds. These heifers were approximately 22 months old.

Table I: Summary of Heat checks. (December 31, 1960)

Breed	Total No. of Heifers	No. observed in heat	Percent
Brahman-Angus	19	18	94.7
Afri-Angus	14	14	100.0
F ₁ Reciprocal Crosses (B-A and A-B)	9	9	100.0
Angus	7	7	100.0
Brahman	3	0	0.0

- G. An experiment was conducted to determine the effect of nutrition and calf removal at weaning on estrus and fertility of open cows of Brahman, Angus, Africander-Angus, and Brahman-Angus breeding.

Cows that were palpated not pregnant, were divided into two groups, after weaning the calves. One group of 15 cows received only pasture while another group of 30 cows received 5 pounds of concentrates per head daily. All cows in both groups came into within a 42 day period. The average interval to first heat was shorter in the non-supplemented cows. Cows in the supplemented group were exposed to a fertile bull and slaughtered 62 days after the beginning of the experiment. Table II shows only 10 percent of the cows bred before the 18th day settled at this service. There was little difference in pregnancy rate of cows showing heat after 22 days whether at a first or second heat. It would appear from these data that most cows which failed to conceive during the regular breeding season were infertile for a period of time after weaning the calf. Plans are to continue this experiment in 1961.

Table II:

Pregnancy Rate of Cows Bred Within a Forty-Two Day Period.

	No.	No. Pregnant	% Pregnant
Cows showing 1st heat before 18th day.	20	2	10.00
Cows showing 1st heat 18-22 days	5	3	60.00
Cows showing 1st heat 23-42 days	5	4	80.00
Cows showing 2nd heat before 28 days	8	6	75.00
Cows showing 2nd heat 29-42 days	10	7	70.00
Total cows	30	22	73.00

Improvement of Facilities:

- Approximately 125 acres of marsh land was cleared, drained and seeded for pasture.
- A main drainage canal that crosses the station was dredged and cleared. This has greatly improved drainage in an area that needed it.
- Bridge culverts in the marsh were reworked and widened to permit more water to drain and to facilitate passage of vehicles.

- D. Two purebred performance tested Brahman bulls were purchased for use in the breeding project.
- E. Two catch pens were constructed at headquarters to facilitate handling of cattle.
- F. A fence was constructed across the recently cleared marsh pastures to allow rotation of pastures and to permit easier driving of cattle to corrals and pens.
- G. A 36' X 72' extension was added to one of the barns near the headquarters. This addition is being used for hay storage.
- H. The old hog barn has been renovated for use as a feeding barn for cattle.
- I. Sixty-seven and a half (67.5) acres of pastures were renovated, leveled and the drainage improved.

V. FUTURE PLANS:

- A. To continue to evaluate strains of Brahman-Angus and Africander-Angus in comparison with Angus and Brahman.
- B. To evaluate the performance of strains of Brahman-Angus with that of reciprocal F_1 crossbred females. The crossbred females will be mated to representative bulls from the Brahman-Angus lines.
- C. To assess the value of Sindhi cows for the production of beef under conditions existing at the Jeanerette Station, by breeding these cows to Angus and Brahman bulls. To evaluate the progeny of Sindhi bulls out of Brahman-Angus cows and Africander-Angus cows for the production of beef.
- D. Improvement of facilities: reclaim more of marshland for pasture by clearing, draining and seeding; add pens to facilitate handling of cattle; improve arrangement of chutes to make handling of cattle easier; continue improvement of drainage in all pastures; renovate and level approximately 100 acres of pasture.

VI. PUBLICATIONS:

Annual reports.

VII. PUBLICATIONS PLANNED:

Data on performance and carcass quality of crossbred strain steers and purebred steers will be published when all the figures are assembled and analyzed.

PERFORMANCE OF COW HERDS. 1960 CALVES

Iberia Livestock Experiment Station

JEAN LA (5)							
Location	Jeanerette Brah-Ang Brah-Ang Brah-Ang	Jeanerette Afri-Ang Afri-Ang Afri-Ang	Jeanerette Comb.Abili Angus Brah-Ang	Jeanerette Comb. Abili Angus Afri-Ang	Jeanerette Crossbred Angus Sindhi	Jeanerette BrossbredF ₁ Angus Brahman	Jeanerette Purebred Angus Angus
No. cows calving	64	11	11	13	4	2	27
No. calves raised	55	10	11	13	4	2	25
Av. inbr. of dams (%)	5.33	10.68	None	None	None	None	None
Av. inbr. of calves (%)	10.73	10.12	None	None	None	None	None
Av. birth date	2/7/60	2/7/60	2/1/60	2/5/60	2/6/60	2/28/60	1/27/60
Av. birth wt. (lbs.)	63	64	64	64	51	63	60
Av. weaning age	220	220	226	222	221	199	231
Av. weaning wt. (lbs.)	439	424	461	407	399	402	399
Av. weaning type score	8.6	7.8	10.0	8.9	9.4	9.8	10.7
Av. weaning condition score	8.5	7.8	9.1	8.2	9.1	9.8	9.1
Were calves creep fed?	No	No	No	No	No	No	No
Adjusted(1) av. daily gain from birth to weaning	1.78	1.67	1.79	1.62	1.66	1.87	1.51

(1) Adjusted to sex of calf and age of dam reduced to steer equivalent.

PERFORMANCE OF COW HERDS. 1960 CALVES

Iberia Livestock Experiment Station

Location Line or group Breed of sire Breed of dam	Jeanerette Comb.Abil. Brahman Brah-Ang	Jeanerette Comb.Abil. Brahman Afri-Ang	Jeanerette Crossbred Brahman Sindhi	Jeanerette Crossbred Brahman Angus	Jeanerette F ₁ Purebred Brahman Brahman	Jeanerette Comb.Abil. Sindhi Brah-Ang	Jeanerette Comb. Abil. Sindhi Afri-Ang
No. cows calving	5	10	6	14	20	12	9
No. calves raised	4	9	5	14	13	11	9
Av. inbr. of dams (%)	10.25	10.62	none	none	none	5.93	10.89
Av. birth date	2/3/60	2/3/60	2/10/60	1/30/60	2/14/60	2/3/60	2/17/60
Av. birth wt. (lbs.)	66	73	52	69	58	66	62
Av. weaning age	224	224	217	228	213	224	210
Av. weaning wt.	465	466	353	447	377	414	369
Av. weaning type score	7.5	8.0	7.7	9.2	8.2	8.2	7.7
Av. weaning condition score	8.0	8.2	7.8	9.2	7.7	9.3	8.9
Were calves creep fed?	No	No	No	No	No	No	No
Adjusted ⁽¹⁾ av. daily gain from birth to weaning	1.79	1.77	1.46	1.83	1.45	1.61	1.51

JEAN LA (6)

(1) Adjusted for sex of calf and age of dam reduced to a steer basis.

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
(or pastured for high gains)

Iberia Livestock Experiment Station

Location Line or group	Jeanerette Afric- Angus	Jaanerette Brah- Angus	Jeanerette Angus	Jeanerette Brahman	Jeanerette Crossbred F1 Brahman
Breed of sire	Afric- Angus	Brah- Angus	Angus	Brahman	Brahman
Breed of dam	Afric- Angus	Brah- Angus	Angus	Brahman	Angus
BULLS, No.	7	11	2		
Av. inbreeding(%)	13.51	7.90	0		
Av. initial age (days)	253	249	257		
Av. initial wt. (lbs.)	426	514	398		
Av. no. days on feed	140	140	140		
Av. final weight	754	862	790		
Av. daily gain	2.34	2.48	2.80		
Av. score					
Conformation	8.8	9.1	11.7		
Condition	9.3	8.9	10.5		
Av. feed per day ⁽¹⁾	17.48	18.27	17.81		
Concentrates	13.11	13.70	13.36		
Roughage	4.37	4.50	4.45		
Feed/lb. gain	7.53	7.23	6.36		
STEERS, No.	11	19	6	1	9
Av. inbreeding (%)	18.37	9.98	0	0	0
Av. initial age (days)	423	414	416	420	412
Av. initial wt. (lbs.)	459	528	461	440	566
Av. no. days on feed	168	168	168	168	168
Av. final weight	782	857	784	715	958
Av. daily gain	1.92	1.95	1.92	1.64	2.34
Av. score					
Conformation	8.0	8.3	12.1	7.5	9.7
Condition	8.5	8.0	11.7	8.0	9.9
Feeding regime ⁽²⁾	- - - - -	Full fed	on pasture	- - - - -	- - - - -

(1) All bulls were fed ad lib in individual pens. Ration consisted of steel cut corn chops, 1200 lbs., cottonseed meal 300 lb.s, and a mixture of allyce clover hay and alfalfa hay in equal proportions by weight. All ingredients were ground to prevent sorting. Salt and bonemeal were provided free choice.

(2) The steers were full fed on pasture a concentrate mixture of corn chops and cottonseed meal. The concentrates were mixed in proportion, by weight, of five parts corn to one part cottonseed meal. Average feed per day was 16.71 (concentrates 12.53 and roughage 4.18). Feed per pound of gain was 8.42.

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER
WEANING (or pastured for high gains)

Iberia Livestock Experiment Station

Location	Jeanerette	Jeanerette
Line or group	Crossbred	Sindhi
Breed of sire	Angus	Sindhi
Breed of dam	Sindhi	Sindhi

STEERS, No.	7	1
Av. initial age (days)	422	362
Av. initial wt. (lbs.)	532	460
Av. no. days on feed	168	168
Av. final weight	859	600
Av. daily gain	1.95	0.83
Av. score		
Conformation	9.6	8.0
Condition	9.5	8.0
Av. feed per day (1)	16.71	16.71
Concentrates	12.53	12.53
Roughage	4.18	4.18
Feed/lb. gain	8.42	8.42

(1)

The steers were full fed on pasture a concentrate mixture of corn chops and cottonseed meal. The concentrates were mixed in proportion, by weight, of five parts corn to one part cottonseed meal.

JEAN LA (9)

PERFORMANCE DATA ON YEARLING OR OLDER CATTLE NOT IN BREEDING
HERDS IN 1959

Location	Jeanerette	Jeanerette	Jeanerette	Jeanerette
Line or group	Brah-Ang	Afri-Angus	Brahman	Ang-Brah F ₁
Breed of sire	Brah-Ang	Afri-Angus	Brahman	Angus
Breed of dam	Brah-Ang	Afri-Ang	Brahman	Brahman
Sex	Heifers	Heifers	Heifers	Heifers
Number	29	15	3	7
Initial				
Date (weaned)	10/6/59	10/6/59	10/6/59	10/6/59
Age (days)	235	245	222	213
Weight (lbs.)	420	400	362	406
Score				
Conformation	8.5	7.9	7.4	9.0
Condition	7.5	7.2	7.2	8.4
First period date	3/8/60	3/8/60	3/8/60	3/8/60
Feeding regime*				
No. days	154	154	154	154
Gain per head	34	52	46	85
Gain per day	0.22	0.34	0.30	0.55
Second period date	5/3/60	5/3/60	5/3/60	5/3/60
No. days	210	210	210	210
Gain per head	120	149	105	200
Gain per day	0.57	0.71	0.50	0.95
Third period	7/26/60	7/26/60	7/26/60	7/26/60
No. days	294	294	294	294
Gain per head	187	220	204	295
Gain per day	0.64	0.75	0.69	1.00
Final 343 days				
Date	9/13/60	9/13/60	9/13/60	9/13/60
Age	578	588	565	556
Weight	645	661	650	737
Score				
Conformation	8.0	8.1	8.3	9.3
Condition	6.9	7.3	7.3	9.0
Gain per day of age	1.12	1.12	1.15	1.33

* For winter feeding they were group fed on pasture approximately 5 lbs. of concentrates per head daily. When forages in the spring had made sufficient growth the concentrates were eliminated and all heifers were maintained on pasture in one group.

JEAN LA (10)

PERFORMANCE DATA ON YEARLING OR OLDER CATTLE NOT IN BREEDING
HERDS IN 1959

Location Line or group Breed of sire Breed of dam	Jeanerette Brah-Ang F ₁ Brahman Angus	Jeanerette Angus Angus Angus	Jeanerette Sindhi X Sindhi Sindhi
Sex	Heifers	Heifers	Heifers
Number	2	7	1
Initial			
Date (weaned)	10/6/59	10/6/59	10/6/59
Age (days)	236	257	252
Weight (lbs.)	428	385	245
Score			
Conformation	7.8	10.6	6.8
Condition	7.4	8.0	7.7
First period date	3/8/60	3/8/60	3/8/60
Feeding regime*			
No. days	154	154	154
Gain per head	140	115	25
Gain per day	0.90	0.75	0.16
Second period	5/3/60	5/3/60	5/3/60
No. days	210	210	210
Gain per head	248	228	55
Gain per day	1.18	1.09	0.26
Third period	7/26/60	7/26/60	7/26/60
No. days	294	294	294
Gain per head	340	261	95
Gain per day	1.16	0.89	0.32
Final 343 days			
Date	9/13/60	9/13/60	9/13/60
Age	579	600	595
Weight	795	668	385
Score			
Conformation	10.0	10.8	7.0
Condition	8.5	9.0	8.0
Gain per day of age	1.37	1.13	0.65

* For winter feeding they were group fed on pasture approximately 5 lbs. of concentrates per head daily. When forages in the spring had made sufficient growth the concentrates were eliminated and all heifers were maintained on pasture in one group.

JEAN 1A (11)

DATA ON ANIMALS SLAUGHTERED

Steers born in 1959 - fed April 5
through September 20, 1960

Iberia Livestock Experiment Station

Location Herd	Jeanerette Brah-Ang	Jeanerette Afri-Ang	Jeanerette Angus	Jeanerette Brahman
Breed of sire	Brah-Ang	Afri-Ang	Angus	Brahman
Breed of dam	Brah-Ang	Afri-Ang	Angus	Brahman
Sex	Steers	Steers	Steers	Steers
No. slaughtered	19	11	6	1
Age at slaughter	582	591	584	588
Time in feedlot (days)	168	168	168	168
Gain in feedlot (lbs.)	329	323	323	375
Final feedlot weight	857	782	784	715
Slaughter weight ⁽¹⁾	819	749	747	677
Carcass weight ⁽²⁾	492	451	470	398
Dressing percentage ⁽³⁾	59.8	60.2	62.8	58.8
Slaughter grade	8.1	8.4	11.7	8.0
Carcass grade	9.0	8.4	10.8	7.0
Fat thickness over rib eye (ins.)	0.65	0.51	0.88	0.32
Rib eye area (sq.in.)	9.26	8.95	8.30	7.77
W-B Shear				
Core size	1 inch	1 inch	1 inch	1 inch
Shear Force (lbs.)	19.40	17.98	17.52	18.21
9-10-11 rib section				
Weight in lbs.	7.57	7.18	7.46	4.80
% fat	30.45	30.97	36.24	26.61
% lean	51.53	50.33	48.16	49.54
% bone	17.81	18.18	15.63	23.85

- (1) Approximately 24 hours elapsed between shipping out time from feedlot to slaughter. Steers were trucked to packing plant 143 miles from station. At plant they were given water until slaughter time. The slaughter weight at the plant was estimated based on shrink of similar steers of two previous years.
- (2) Chilled carcass weights were used. Warm carcass weights were shrunk 1.8% to obtain cold carcass weights.
- (3) Estimated live weight at the slaughter plant and the chilled carcass weight were used to calculate the cold dressing percent.

JEAN LA (12)

DATA ON ANIMALS SLAUGHTERED

Iberia Livestock Experiment Station

Location Herd	Jeanerette Crossbred	Jeanerette Sindhi	Jeanerette Crossbred F ₁	Jeanerette Crossbred F ₁
Breed of sire	Angus	Sindhi	Angus	Brahman
Breed of dam	Sindhi	Sindhi	Brahman	Angus
Sex	Steers	Steers	Steers	Steers
No. slaughtered	7	1	7	2
Age at slaughter	590	530	578	593
Time in feedlot (days)	168	168	168	168
Gain in feedlot (lbs.)	327	140	401	363
Final feedlot weight	859	600	925	1075
Slaughter weight (1)	828	572	884	1028
Carcass weight (2)	500	334	553	668
Dressing percentage(3)	60.4	58.4	62.6	65.0
Slaughter grade	9.5	8.0	9.5	11.8
Carcass grade	10.1	8.0	9.7	12.0
Fat thickness over rib eye (ins.)	0.68	0.69	0.67	1.20
Rib eye area (sq.in.)	9.29	7.17	10.29	10.56
W-B Shear				
Core size	1 inch	1 inch	1 inch	1 inch
Shear Force (lbs.)	21.30	21.91	17.88	15.00
9-10-11 Rib Section				
Weight in lbs.	8.23	4.88	8.8	11.04
% fat	36.75	36.60	31.24	40.08
% lean	48.20	46.44	52.55	44.67
% bone	15.34	16.95	16.19	15.27

- (1) Approximately 24 hours elapsed between shipping out time from feedlot to slaughter. Steers were trucked to packing plant 143 miles from station. At plant they were given water until slaughter time. The slaughter weight at the plant was estimated based on shrink of similar steers of two previous years.
- (2) Chilled carcass weights were used. Warm carcass weights were shrunk 1.8% to obtain cold carcass weights.
- (3) Estimated live weight at the slaughter plant and the chilled carcass weight were used to calculate the cold dressing percent.

MD (1)

Maryland Station

by

W. W. Green

I. PROJECT: C-14 (S-10)

A Study of Productiveness of Purebred Beef Cattle in Maryland.

II. OBJECTIVES:

- A. To study productiveness of existing or introduced stocks of beef cattle. Productive characteristics measured will include rate of gain, economy of gain, market type, carcass quality, fertility, longevity, adaptation to environmental conditions, and other factors affecting the utility value of beef cattle.
- B. To compare selective criteria (individual and pedigree) with actual performance of progeny.
- C. To evaluate breeding techniques for small purebred herds under the varying conditions encountered in practice in purebred herds.
- D. To attempt to produce beef cattle with superior productive capacities by line breeding and selection. (Using criteria of selection as developed in this project and by cooperating stations in this and other regions.)

III. PERSONNEL:

Department Animal Husbandry, University of Maryland: Dr. W. W. Green, Professor; Dr. J. Buric, Assistant Professor; Mr. W. R. Stevens, Research Assistant; and Dr. J. E. Foster, Head and Professor.

IV. ACCOMPLISHMENTS DURING THE YEAR:

- A. Scope and nature of the work: The primary activities have been directed toward the accumulation of data for future study, the initiation of essentially new studies, and the development of techniques.

Routine weights, measurements, and scores have been obtained on approximately 87 head of University owned purebred Angus and Hereford cattle when 6, 12, 24, or 48 months of age as the case might have been.

In addition, new work includes the recording of live measurements when calves are three weeks old for subsequent studies of growth.

Weaning weights were taken for 43 Angus bull and 35 heifer calves in a cooperator's herd. All weaned bull calves were placed on post-weaning gain-test trials: 35 on the cooperator's farm and 8 at bull feeding stations. Thirty-five heifers were placed on post-weaning gain-test trials at Wye Plantation.

An analysis of the Angus herd at Wye Plantation has been initiated. Coefficients of inbreeding, based on 5-generation pedigrees, have been calculated for all foundation females, all bulls used in the herd, and all combinations of bulls and cows from which at least one calf resulted (a total of 1085 coefficients). The family structure of the herd has been established; this involved 18 families and 1709 calves. A study of calving interval has been initiated. A total of 170 purchasers of bulls has been asked to furnish records if available, for the purpose of extending the scope of the project.

Work has been re-initiated on the problem of estimating the weights of wholesale cuts of carcasses by the use of measurements taken on the live animal. Numerous measurements were taken by use of calipers, steel tape, and a pliable material for contours plus live weight on 12 beef steers and 18 dairy cows prior to slaughter. Similar measurements, weights of wholesale cuts, and tracings of all subdivisions of 9 of the steer and 13 of the dairy cow carcasses were obtained. In addition, the wholesale cuts of the cow carcasses were sectioned at various places for additional tracings and were also boned for muscle-bone studies. The total area for each of 306 of 439 surfaces of carcass cuts and all of the 409 contoured locations on live animals has been obtained by use of a planimeter. Detailed, exploratory studies have been initiated relative to the round.

A comprehensive and detailed study of the literature pertaining to measurements of all classes of livestock has been initiated. Approximately 1000 references have been cataloged. Listing of all zero order correlations has been initiated. These will be followed by first order correlations and estimates of heritability.

- B. Research results: Specific results have not been numerous because of the time required to initiate and accomplish all of the background work indicated above and because of the exploratory nature of activities.

Fifty-four percent of the combinations of different cows and bulls in the herd at Wye Plantation resulted in zero percent of inbreeding of offspring which could result from the crosses. Eleven percent of the combinations would result in 0.01 percent inbreeding. The rest of the coefficients of inbreeding ranged from 0.3 to 0.42 percent. The number of different females bred to any one bull ranged from 1 to 151.

Observations and calculations indicate that cross sectional areas of the round fit more closely to an ellipse than to a circle or triangle. Indications exist that some measurements may be of value for describing objectively some differences in conformation.

V. FUTURE PLANS

This project will be terminated and all measurements and other data will be transferred to a different project.

VI. PUBLICATIONS:

None.

I. SUB-PROJECT: C-14-a

Effect of early weaning on the duration of maternal influences in beef calves.

II. OBJECTIVES:

- A. To attempt to develop a new technique for an earlier evaluation of feed lot performance, progeny testing, and genetic evaluation of beef animals.
- B. To develop sound feeding and management practices for early weaned beef calves.
- C. To evaluate the calves' genetic ability to thrive under new systems of care.

III. PERSONNEL:

Department of Animal Husbandry, University of Maryland: Dr. W. W. Green, Professor; Dr. J. Buric, Assistant Professor; and Dr. J. E. Foster, Head and Professor. Department of Experimental Statistics, University of Georgia: Dr. J. L. Carmon, Head and Professor.

IV ACCOMPLISHMENTS:

- A. Scope and nature of work: Feeding data: The two manuscripts mentioned as planned last year have been completed.

Measurement Data: Additional coefficients of zero order, first order partial, and multiple correlations have been calculated (a number of hundreds - no count actually made).

- B. Research results. Feeding data: All essential results have been presented in previous reports.

Measurement data: As in previous studies, moderate to large reductions in the magnitude of coefficients were found between zero order and first order partial correlations, $r_{\text{measurement}}$, measurement·live weight or $r_{\text{measurement}}$, weight of cut·live weight. Multiple correlations, $Y = \text{weight of cut}$, indicated that measurements not closely associated anatomically with a cut may be potent in estimating the weight of a cut and vice versa. In many instances the use of simple rectilinear distances, obtained by use of a caliper, seems to be of little value for estimating weights of cuts.

V. FUTURE PLANS:

This project will be terminated and measurement data will be transferred to a different project.

VI. PUBLICATIONS:

Green, W. W. and J. Buric. Further studies on the comparative performance of beef calves weaned at 90 or 180 days of age. University of Maryland Agricultural Experiment Station Technical Bulletin A 112 (in press).

Green, W. W. Further studies on the comparison of methods for estimating the feed used for growth and maintenance of beef calves. University of Maryland Agricultural Experiment Station Technical Bulletin A 112 (in press).

VII. PUBLICATIONS PLANNED:

None.

PERFORMANCE OF COW HERDS. 1960 CALVES

University of Maryland Station

Location	U. of Md.	U. of Md.
Line or group	U. of Md.	U. of Md.
Breed of sire	Angus	Hereford
Breed of dam	Angus	Hereford
No. cows calving	26	20
No. calves raised	26	19
Av. inbr. of dams (%)	Outbred	Outbred
Av. inbr. of calves (%)	Outbred	Outbred
Av. birth date	2/23/60	3/11/60
Av. birth wt. (lbs.)	59	67
Av. weaning age (days)	216	209
Av. weaning wt.	488	417
Av. weaning type score	13	13
Av. weaning condition score	12	12
Were calves creep fed?	Yes	Yes
Adjusted ⁽¹⁾ av. daily gain from birth to weaning	2.05	1.84

(1) Adjusted for sex, age of dam and creep feeding (P.R. I.).

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
(or pastured for high gains)

University of Maryland Station

Location	U. of Md.	U. of Md.
Line or group	U. of Md.	U. of Md.
Breed of sire	Angus	Hereford
Breed of dam	Angus	Hereford
STEERS, No. Full Fed	12	9
Av. inbreeding (%)	Outbred	Outbred
Av. initial age (days)	237	205
Av. initial wt. (lbs.)	502	434
Av. No. days on feed	252	252
Av. final weight	959	1001
Av. daily gain	1.81	2.25
Av. score		
Conformation	13	14
Condition	13	14
Av. feed per day (1)	Fed together	
Concentrates	12.3	12.3
Roughage	5.0	5.0
Feeding regime	Group - self fed	
HEIFERS, No.	15	12
Av. inbreeding (%)	Outbred	Outbred
Av. initial age (days)	252	208
Av. initial wt. (lbs.)	473	419
Av. no. days on feed	196	196
Av. final weight	760	735
Av. daily gain	1.46	1.61
Av. score		
Conformation	13	13
Condition	13	12
Av. feed per day (1)	Fed together	
Concentrates	12.0	12.0
Roughage	2.3	2.3
Feeding regime	Group - self fed	

(1) Steers fed Alfalfa hay, Soybean Oil Meal and either ground or pelleted barley. Heifers fed Alfalfa hay, Soybean Oil Meal or "Morea" and ground or pelleted barley. All calves had access to salt and a mineral mixture. All sexes fed together.

DATA ON ANIMALS SLAUGHTERED

University of Maryland Station

Location	Univ. of Md.	Univ. of Md.
Herd	Univ. of Md.	Univ. of Md.
Breed of sire	Angus	Hereford
Breed of dam	Angus	Hereford
Sex	Female	Female
No, slaughtered	19 ⁽¹⁾	7
Age at slaughter	452	391
Time in feedlot (days)	196	196
Gain in feedlot (lbs.)	287	294
Final feedlot weight	728	697
Slaughter weight ⁽²⁾	706	672
Carcass weight ⁽³⁾	439	412
Dressing percentage ⁽⁴⁾	62	61
Slaughter grade	12	11
Carcass grade	12	11
Rib eye area (sq. in.)	8.60	8.07
Conformation grade	12	12
Finish Grade	12	12
Marbeling grade	12	11

{1} Includes 9 that were purchased as weaned calves.

{2} Slaughtered on 3rd day after end of experiment. Kept on full feed.
Approximately 16 lbs. shrink

{3} Cold carcass net.

{4} Slaughter weight and cold carcass weight.

Mississippi Station

by

J. C. Taylor

I. PROJECT: Hatch 666

A Study to Determine the Breeding Worth of Inbred and Outbred Bulls from Various Sources

II. OBJECTIVES:

To compare pre- and post-weaning growth rates, market grades, carcass qualities carcass grades and maternal ability of the progenies of potentially superior sires selected from various sources.

III. PERSONNEL:

J. C. Taylor, Assistant Animal Husbandman, State College, Mississippi
L. F. Bowlin, Superintendent, Prairie Station, Prairie, Mississippi
C. E. Lindley, Animal Husbandman, State College, Mississippi

IV. ACCOMPLISHMENTS DURING THE YEAR:

Weights and grades were collected at weaning on 115 Hereford calves from six bull units and 77 Angus calves from four bull units. Average daily gains from birth to weaning adjusted for sex and age of dam and also grades were as follows for each Hereford unit: Oklahoma OK6-62, 1.69 and 11.8, California 371, 1.74 and 11.9, Colorado 7002, 1.72 and 10.9, Colorado 7078, 1.78 and 11.3. Poplarville (control bull), 1.66 and 10.9, and Montana 1.72 and 11.0. Gains and grades respectively for the Angus units were Oklahoma 436, 1.88 and 11.7, Oklahoma 066, 1.67 and 11.4, Virginia 9.7, 1.77 and 12.7 and Jackson 255 (control bull) 1.80 and 12.4.

The 53 tester steers consisting of 30 Hereford, 13 Shorthorn and 10 Angus were started on oat-ryegrass grazing October 21, 1959 and taken off grazing and fed dry feed from January 19, 1960 until returned to grazing April 4, 1960. On June 6, 1960 they were again taken off grazing and placed on a full feed of corn until slaughter on June 21, 1960. Average daily gains from October 21, 1959 to June 21, 1960 ranged from 1.40 pounds per day to 1.81 for the Hereford, 1.41 to 1.61 for the Shorthorn and 1.47 and 1.41 for the two Angus units. At slaughter, 18 of the carcasses graded good and 35 graded standard. Other detailed carcass measurements were taken and the 12th rib steak was removed for tenderness studies.

V. FUTURE PLANS:

To be continued.

VI. PUBLICATIONS DURING THE YEAR AND PUBLICATIONS PLANNED:

None

Mississippi Station

by

C. E. Lindley

I. PROJECT: 645

A study to Measure the Productivity of Large, Intermediate and Small Type Hereford Cattle

II. OBJECTIVES:

To determine which of three types of cattle; large, medium or small, is the most suitable for beef production in Mississippi.

III. PERSONNEL:

C. E. Lindley, Animal Husbandman, State College, Mississippi.

E. G. Morrison, Superintendent, Brown Loam Branch Experiment Station, Raymond.

J. A. McGuire, Superintendent, Natchez Branch Experiment Station, Natchez.

Clyde Blount, Agronomist, South Mississippi Branch Experiment Station, Poplarville, Mississippi.

S. P. Crockett, Superintendent, North Mississippi Branch Experiment Station, Holly Springs, Mississippi.

B. C. Hurt, Superintendent, Pontotoc Branch Experiment Station, Pontotoc.

John Campbell, Superintendent, Truck Crops Branch Experiment Station, Crystal Springs, Mississippi.

W. R. Backus, Assistant Animal Husbandman, State College, Mississippi.

IV. ACCOMPLISHMENTS DURING THE YEAR:

The first calf crop from the various groups were weaned and placed on winter grass. Calves will be slaughtered off grass in late May to get carcass information. Other calves will be fed and slaughtered in late summer and fall. The unadjusted weaning weights and grades of the calves were as follows:

Stations	Brown Loam		South Miss.		Truck Crops	
Type						
Small	Wt.	Grade	Wt.	Grade	Wt.	Grade
Steers	392(17)	10.9	371(10)	9.8	314(11)	7.5
Heifers	393(13)	10.8	343(5)	10.2	303(15)	7.0
Medium						
Steers	396(12)	10.3	426(5)	10.0		
Heifers	407(13)	10.8	374(7)	10.1		
Large						
Steers	363(14)	9.8	410(4)	10.0		
Heifers	328(12)	9.1	401(6)	9.2		
		Pontotoc		Natchez		
Medium						
Steers	503(13)	10.1	436(13)	10.1		
Heifers	328(12)	9.1	401(6)	9.2		

V. FUTURE PLANS:

To continue project as outlined.

VI. PUBLICATIONS DURING THE YEAR:

None

VII: PUBLICATIONS PLANNED:

None.

* * * * *

by

Bryan Baker, Jr.

I. PROJECT: Hatch 642 (S-10)

Lowered Fertility in the Bovine

II. OBJECTIVES:

- A. Make a survey of the reproductive performance of cattle in the Mississippi Experiment Station System.
 1. Determine the reproductive efficiency for each herd of the system.
 2. Determine what factors may be contributing to reproductive inefficiency.
- B. To determine the nature of sterility in cows leaving the herd because of low reproductive performance.
- C. Propose and test possible treatments which may increase reproductive efficiency.

III. PERSONNEL:

Bryan Baker, Jr., Animal Husbandman, State College, Mississippi.
T. D. Clark, Research Technician, State College, Mississippi.
R. E. Deese, Assistant Animal Husbandman, State College, Mississippi.
J. C. Taylor, Assistant Animal Husbandman, State College, Mississippi.
J. W. Scales, Veterinarian, Veterinary Science Department, State College.
C. E. Lindley, Animal Husbandman, State College, Mississippi.

IV. ACCOMPLISHMENTS DURING THE YEAR:

1. In the Mississippi Experiment Station System there are more than 1000 beef and dairy cows in the breeding herds and each year a number of these cows are replaced because they have poor reproductive performance.

It is from these animals that experimental animals are secured for this study. Only cows that meet the criteria for a hard to settle cow (as outlined in the project outline) are used. Facilities for handling the cows, examination of the reproductive tracts and ova are available.

2. The nature of such a study makes it impossible to draw any conclusions from a few years work thus only a summary of the last years activities are included.

Seven cows were used in this study during 1960 and very little information was gathered. Of these cows only two had abnormalities of the reproductive system. A. Fluid filled uterus B. Adhesion of the ovaries and hydrosalpinx. One cow was pregnant when she entered the study and of the other four cows there was evidence of two having abnormal estrual cycles. No explanation of the failure of the other two cows to settle is evident.

At the present time, as a result of rather strict culling practices imposed on most Experiment Station herds, fewer cows become available for this study. Nine cows have been assembled for this project and are being observed and bred at this time. Data from these cows will not be available until after July 1, 1961.

V. FUTURE PLANS:

Because it is necessary to accumulate additional data before any analyses can be attempted, this project will be continued without revision.

VI. PUBLICATIONS DURING THE YEAR:

None

VII. PUBLICATIONS PLANNED:

None.

Mississippi Station

by

W. R. Backus

I. PROJECT:

Hatch 646

II. OBJECTIVES:

- 1) To compare feeding and management practices for the production of slaughter cattle in Mississippi.
- 2) To evaluate the quality of carcasses produced from steers under the different systems of management.
- 3) To evaluate the consumer acceptance of carcasses produced under each system of feeding and management.

III. PERSONNEL:

W. R. Backus, Assistant Animal Husbandman, State College, Mississippi
 J. C. Taylor, Assistant Animal Husbandman, State College, Mississippi
 C. E. Lindley, Animal Husbandman, State College, Mississippi

IV. ACCOMPLISHMENTS DURING THE YEAR:

Seven lots of 6 beef steers were placed on experiment to determine the system of feeding and management which would produce the most acceptable carcasses the most efficiently. The lots were handled as follows: Lot 1. Weanling steers killed at weaning; Lot 2. Weaned, winter grazed and killed; Lot 3. Weaned, fed as stockers, spring and summer grazed, winter grazed and killed; Lot 4. Weaned, fed as stockers, spring grazed, fed in drylot and killed; Lot 5. Weaned, fed as stockers, spring grazed, fed on pasture and killed; Lot 6. Weaned, fed as stockers, spring and summer grazed, winter grazed, fed in drylot and killed.

Lot	Car- cass Grade	Mar- bling Score**	% Lean 9-10-11 Rib	% Fat 9-10-11 Rib	% Bone 9-10-11 Rib	Rib Eye Area	Fat Thickness at 12th Rib	Dress- ing %
1	8.7	10.5	51.2	28.9	19.9	5.2	.44	60.7
2	9.5	8.2	48.5	35.3	15.5	9.3	.55	58.6
3	7.7	9.7	54.7	28.4	16.3	9.3	.72	59.1
5	11.0	6.7	40.6	46.6	21.4	9.4	.84	60.3
6	11.3	6.5	39.2	48.1	12.6	10.2	.89	60.5

* 16 = Ave. Prime, 13 = Ave. Choice, 10 = Ave. Good and 7 = Ave. Standard
 ** Score ranged from 1 = Very abundant to 12 = Devoid.

Average daily gain per day in pounds by lots were as follows: L-2 1.64; L-3 1.62; L-4 .82 as stockers, 1.83 on spring grazing, .93 on summer pasture, 1.63 on winter grazing; L-5 .80 as stockers, 1.47 on spring grazing, 1.47 in drylot; L-6 1.06 as stockers, 1.63 on spring grazing, 1.64 on pasture; L-7 .80 as stockers, 1.58 on spring grazing, 1.23 on summer pasture and 2.10 on winter grazing.

PERFORMANCE OF COW HERDS. 1960 CALVES

Mississippi Station

Location	Pairie	Pairie	Pairie	Pairie	Pairie	Pairie
Line or group	Colo 7078	Colo 7002	Calif 371	Okla 6-62	Poplarville	Montana 481
Breed of sire	Hereford	Hereford	Hereford	Hereford	Hereford	Hereford
Breed of dam	Hereford	Hereford	Hereford	Hereford	Hereford	Hereford
No. cows calving	22	17	26	24	24	24
No. calves raised	19	15	20	23	17	20
Av. birth date	3/7/60	3/8/60	3/8/60	3/5/60	3/13/60	3/7/60
Av. birth wt. (lbs.)	81.0	74	72	69	69	72
Av. weaning age (days)	231	230	230	233	225	231
Av. weaning wt.	362	352	356	347	340	352
Av. weaning type score	11.3	10.9	11.9	11.8	10.9	11.0
Were calves creep fed?	No	No	No	No	No	No
Adjusted(1) av. daily gain from birth to weaning	1.76	1.72	1.74	1.69	1.66	1.72

Miss (6)

(1) Weaning weights and daily gains to weaning were adjusted to a mature dam equivalent, for sex and to a constant age of 205 days.

PERFORMANCE OF COW HERDS. 1960 CALVES
Mississippi Station

Location Line or group	Prairie Chester	Prairie Goodnews 56-66	Prairie Okla. 436	Prairie Okla. 066	Prairie Va 917	Prairie Jackson 255
Breed of sire	Shorthorn	Shorthorn	Angus	Angus	Angus	Angus
Breed of dam	Shorthorn	Shorthorn	Angus	Angus	Angus	Angus
No. cows calving	13	15	24	22	22	26
No. calves raised	13	15	19	19	18	21
Av. birth date	4/20/60	3/28/60	3/6/60	2/25/60	3/4/60	2/23/60
Av. birth wt. (lbs.)	71	70	70	58	62	64
Av. weaning age (days)	184	207	228	237	230	239
Av. weaning wt.	383	353	385	343	363	370
Av. weaning type score	11.7	11.2	11.7	11.4	12.7	12.4
Were calves creep fed?	No	No	No	No	No	No
Adjusted(1) av. daily gain from birth to weaning	1.87	1.72	1.88	1.67	1.77	1.80

Miss (7)

(1) Weaning weights and daily gains to weaning were adjusted to a mature dam equivalent, for sex and to a constant age of 205 days.

DATA ON ANIMALS SLAUGHTERED

Mississippi Station

Location Herd	Prairie Colo Royal 6046	Prairie Colo Brae Arden 6086	Prairie Calif Rover 369	Prairie Okla. 6-60	Prairie Poplarville 116
Breed of sire	Hereford	Hereford	Herefprd	Hereford	Hereford
Breed of dam	Hereford	Hereford	Herefprd	Hereford	Hereford
Sex	Male	Male	Male	Male	Male
No. slaughtered	5	5	5	5	5
Age at slaughter	500	493	469	473	489
Time in feedlot (days)	243	243	243	243	243
Gain in feedlot (lbs.)	1.81	1.40	1.50	1.58	1.45
Final feedlot weight	914	786	769	851	775
Slaughter weight(1)	914	786	769	851	775
Carcass weight(2)	542	461	456	523	459
Dressing percentage(3)	59.3	58.7	59.3	59.0	59.2
Slaughter grade	10.8	10.1	10.3	11.0	10.0
Carcass grade	8.4	7.6	7.8	7.4	7.6
Fat thickness over rib eye (ins.)	0.65	0.48	0.53	0.71	0.51
Rib eye area (sq.in.)	10.43	9.60	9.10	9.12	8.43
Marbling score(4)	8.8	9.8	10.4	10.0	9.8
Carcass length	46.7	44.3	44.3	45.5	43.9
Circumference of round	29.7	29.7	30.5	30.5	29.5
Width of round	9.4	9.0	9.0	9.4	9.0
Loin length	24.4	22.6	23.2	23.0	24.9
Width of chest	7.88	7.51	7.39	7.57	7.29
Depth of chest 5th rib	16.4	15.0	14.5	15.6	15.2
Depth of chest 7th rib	17.5	16.0	15.4	16.5	16.5

(1) Steers were weighed during early morning, loaded on trucks and hauled to slaughter plant where they were killed the next day. Individual weights were not taken at the slaughter plant.

(2) Hot carcass weight.

(3) Final feedlot weights and hot carcass weights were used to calculate the dressing percentage.

(4) 1 through 12 according to USDA grade standards, with 1 extremely abundant and 12 void.

DATA ON ANIMALS SLAUGHTERED

Mississippi Station

Location	Prairie Montana	Prairie Goodnews	Prairie Susanna	Prairie Va. 1339	Prairie Va. 1195
Berd	481	56-66	66-66		
Breed of sire	Hereford	Shorthorn	Shorthorn	Shorthorn	Angus
Breed of dam	Hereford	Shorthorn	Shorthorn	Shorthorn	Angus
Sex	Male	Male	Male	Male	Male
No. slaughtered	5	4	4	5	5
Age at slaughter	451	497	465	472	485
Time in feedlot (days)	243	243	243	243	243
Gain in feedlot (lbs.)	1.63	1.55	1.47	1.41	1.47
Final feedlot weight	784	815	776	782	801
Slaughter weight ⁽¹⁾	784	815	776	782	801
Carcass weight ⁽²⁾	447	486	469	474	473
Dressing percentage ⁽³⁾	57.1	59.7	60.4	60.7	59.1
Slaughter grade	9.5	10.7	10.4	9.7	10.3
Carcass grade	7.0	9.2	8.8	8.8	9.0
Fat thickness over rib eye (ins.)	0.52	0.90	0.54	0.63	0.73
Rib eye area (sq.in.)	8.49	9.07	9.70	8.91	9.16
Marbling score ⁽⁴⁾	10.4	9.0	9.2	8.8	8.4
Carcass length	44.1	45.3	44.0	45.3	44.4
Circumference of round	29.3	29.4	29.9	30.0	29.8
Width of round	8.5	9.0	9.2	9.2	9.1
Loin length	22.6	22.4	22.8	23.5	23.2
Width of chest	7.21	7.50	7.45	7.53	7.79
Depth of chest 5th rib	15.3	15.5	15.2	15.5	15.0
Depth of chest 7th rib	16.0	16.2	16.1	16.4	15.9

(1) Steers were weighed during early morning, loaded on trucks and hauled to slaughter plant where they were killed the next day. Individual weights were not taken at the slaughter plant.

(2) Hot carcass weight.

(3) Final feedlot weights and hot carcass weights were used to calculate the dressing percentage.

(4) 1 through 12 according to USDA grade standards, with one (1) extremely abundant and (12) void.

DATA ON ANIMALS SLAUGHTERED

Mississippi Station

Location	Prairie
Herd	Maplemere
	1100
Breed of sire	Angus
Breed of dam	Angus
Sex	Male
<hr/>	
No. slaughtered	5
Age at slaughter	491
Time in feedlot (days)	243
Gain in feedlot (lbs.)	1.41
Final feedlot weight	831
Slaughter weight	813
Carcass weight	499
Dressing percentage	60.0
Slaughter grade	10.8
Carcass grade	10.4
Fat thickness over	
rib eye (ins.)	0.94
Rib eye area (sq.in.)	9.69
Marbling score	7.0
Carcass length	44.5
Circumference of round	30.5
Width of round	9.3
Loin length	21.7
Width of chest	7.72
Depth of chest 5th rib	15.3
Depth of chest 7th rib	15.9

- (1) Steers were weighed during early morning, loaded on trucks and hauled to slaughter plant where they were killed the next day. Individual weights were not taken at the slaughter plant.
- (2) Hot carcass weight.
- (3) Final feedlot weights and hot carcass weights were used to calculate the dressing percentage.
- (4) 1 through 12 according to USDA grade standards, with one (1) extremely abundant and (12) void.

PERFORMANCE DATA ON YEARLING OR OLDER CATTLE NOT IN BREEDING
HERDS IN 1959

Location	Prairie	Prairie	Prairie	Prairie
Line or group	Colo 6046	Colo 6086	Calif. 369	Okla. 6-60
Breed of sire	Hereford	Hereford	Hereford	Hereford
Breed of dam	Hereford	Hereford	Hereford	Hereford
Sex	Male	Male	Male	Male
Number	5	5	5	5
Initial				
Date	10/21/59	10/21/59	10/21/59	10/21/59
Age (days)	257	250	226	230
Weight (lbs.)	473	446.6	404.4	467.0
Score				
Conformation	10.3	11.6	10.7	11.4
First period				
Feeding regime	- - - - - Winter grazing - - - - -			
No. days	90	90	90	90
Gain per head	136.0	130.4	137.8	130.2
Gain per day	1.51	1.45	1.53	1.45
Second period				
Feeding regime	- - - - - Limited grain plus hay - - - - -			
No. days	75	75	75	75
Gain per head	129.0	69.6	86.8	98.4
Gain per day	1.72	.93	1.16	1.31
Third period				
Feeding regime	- - - - - Winter grazing plus full feed of corn			
No. days	78	78	78	78
Gain per head	176	121.4	140.0	155.4
Gain per day	2.25	1.56	1.79	1.99
Final				
Date	6/21/60	6/21/60	6/21/60	6/21/60
Age	500	493	469	473
Weight	914.0	786.0	769.0	851.0
Score				
Condition	10.8	10.1	10.3	11.0
Gain per day of age	1.83	1.59	1.64	1.80

PERFORMANCE DATA ON YEARLING OR OLDER CATTLE NOT IN BREEDING
HERDS IN 1959

Location	Prairie	Prairie	Prairie	Prairie
Line or group	Poplarville	Montana	Goodnews	Susanna
	116	481	56-66	66-66
Breed of sire	Hereford	Hereford	Shorthorn	Shorthorn
Breed of dam	Hereford	Hereford	Shorthorn	Shorthorn
Sex	Male	Male	Male	Male
Number	5	5	4	4
Initial				
Date	10/21/59	10/21/59	10/21/59	10/21/59
Age (days)	246	208	254	222
Weight (lbs.)	423.8	387.0	437.8	419.0
Score				
Conformation	10.0	10.0	11.6	11.0
First period				
Feeding regime	- - - - - Winter grazing - - - - -			
No. days	90	90	90	90
Gain per head	137.4	132.4	137.9	111.0
Gain per day	1.53	1.47	1.53	1.23
Second period				
Feeding regime	- - - - - Limited gain plus hay - - - - -			
No. days	75	75	75	75
Gain per head	183.8	108.6	120.5	105.0
Gain per day	1.12	1.45	1.61	1.40
Third period				
Feeding regime	- - - Winter grazing plus full feed of corn - - - - -			
No. days	78	78	78	78
Gain per head	130.0	156.0	118.8	141.3
Gain per day	1.67	2.00	1.52	1.81
Final				
Date	6-21/60	6/21/60	6/21/60	6/21/60
Age	489	541	497	465
Weight	775	784.0	815.0	776.3
Score				
Condition	10.0	9.5	10.7	10.4
Gain per day of age	1.58	1.74	1.64	1.67

PERFORMANCE DATA ON YEARLING OR OLDER CATTLE NOT IN BREEDING
HERDS IN 1959

Location	Prairie	Prairie	Prairie
Line or group	Va. 1339	Va. 1195	Maplemere 1100
Breed of sire	Shorthorn	Shorthorn	Angus
Breed of dam	Shorthorn	Shorthorn	Angus
Sex	Male	Male	Male
Number	5	5	5
Initial			
Date	10/21/59	10/21/59	10/21/59
Age (days)	229	242	248
Weight (lbs.)	438.4	443.6	488.8
Score			
Conformation	10.0	11.0	11.4
First period			
Feeding regime	- - Winter grazing - - - - -		
No. days	90	90	90
Gain per head	115.0	117.2	86.2
Gain per day	1.28	1.30	.96
Second period			
Feeding regime	- - - - Limited grain plus hay - - - - -		
No. days	75	75	75
Gain per head	115.6	98.2	122.6
Gain per day	1.54	1.31	1.63
Third period			
Feeding regime	- - - Winter grazing plus full feed of corn - -		
No. days	78	78	78
Gain per head	113.0	141.8	133.4
Gain per day	1.45	1.82	1.71
Final			
Date	6/21/60	6/21/60	6/21/60
Age	472	485	491
Weight	782.0	800.8	831.0
Score			
Condition	9.7	10.3	10.8
Gain per day of age	1.66	1.65	1.69

NORTH CAROLINA STATION

by

E. U. Dillard

I. PROJECT: Animal Industry H-198 (S-10) (AHRD-d1-23)

Genetic and Environmental Interactions for Performance and Carcass Traits in Beef Cattle

II. OBJECTIVES:

- A. To evaluate the importance of sire-by-location interactions for performance traits.
- B. To evaluate sire-by-location and ration interaction for gain and carcass characteristics of steer progeny.
- C. To develop and evaluate selection criteria for improvement of productive efficiency and market quality.

III. ACCOMPLISHMENTS DURING THE YEAR:

1960 was the first year of operation of this project which replaced Project S-74 (RR-S-10). Frozen semen from three purebred Hereford bulls was used to inseminate the Hereford cows at Raleigh, Laurel Springs, Plymouth and Butner. A total of 241 cows were inseminated. Percentage of conceptions was very low except in one herd where a technician was present daily. In this herd there was an 88 percent pregnancy with an average of only 1.9 services per conception.

In the three herds at Plymouth, Raleigh and Laurel Springs 1960 calves were graded and weighed at approximately 120 days of age and at weaning. Post weaning performance-on-feed tests were initiated at each of these locations. To introduce new blood into the herds a set of half sib calves (6 bulls and 4 heifers) were purchased in Virginia at weaning and included in the post weaning feed tests at Raleigh.

IV. FUTURE PLANS

Approximately 250 head of cows will be inseminated in the four herds of this project in 1961. Slaughter data on the first progenies fed according to project plans will be obtained from steers at two locations and on the bulls not retained for breeding of those on post weaning performance test at Raleigh. In an attempt to increase conception rate the herdsmen from each of the farms will receive training in artificial insemination prior to the breeding season. Otherwise the project will proceed according to plan.

V. PUBLICATIONS:

None

VI. PUBLICATIONS PLANNED:

None

VII. PERSONNEL ACTIVE IN THE PROJECT:

E. U. Dillard, J. H. Gregory, J. E. Legates and O. W. Robison,
Raleigh, North Carolina.

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
(or pastured for high gains)

North Carolina Station

Location	Raleigh
Line or group	Hereford
Breed of sire	Hereford
Breed of dam	Hereford

BULLS, No.	20
Av. inbreeding (%)	1.0
Av. initial wt. (lbs.)	468.00
Av. no. days on feed	154
Av. final weight	722.25
Av. daily gain	1.65*
Av. score	
Conformation	11.4
Av. feed per day	
Concentrates	14.29
Roughage	1.75
Feeding regime	group-full fed

*One bull had an accident and lost 200 lbs. before recovery.

Ration fed to bulls after weaning 1959-60*

Ground snapped corn	1275 lbs.
Ground corn cobs	400 "
Dehydrated alfalfa meal	100 "
Soybean oil meal	200 "
Deflourinated phosphate	12 "
Ground limestone	6 "
Trace mineralized salt	7 "

TOTAL	2000 lbs.
-------	-----------

*Mixed grass-clover hay fed at libitum.

PERFORMANCE OF COW HERDS. 1960 CALVES

North Carolina Station

Location Line or group Breed of sire Breed of dam	Raleigh Hereford Hereford Hereford	Plymouth Hereford Hereford Hereford	Laurel Spgs. Hereford Hereford Hereford
No. Cows calving	55	51	18
No. calves raised	43	49	17
Av. inbr. of dams (%)	0.0	2.4	0.0
Av. inbr. of calves (%)	2.0	3.4	2.3
Av. Birth date	1-8-60	3-5-60	2-10-60
Av. Birth wt. (lbs.)	56.0	64.9	62.6
Av. weaning age	242	190	216
Av. weaning wt.	337	340	376
Av. weaning type score	<u>9.5</u>	<u>10.3</u>	<u>11.0</u>
Were calves creep fed?	bulls, yes* heifers, no	no	no
Adjusted ⁽¹⁾ av. daily gain from birth to weaning	1.25	1.60	1.62

(1) Adjustments were made for sex, age of dam and season of birth.

*bull calves were creep fed after youngest calf was 120 days old.

South Carolina Station

by

W. C. Godley

I. PROJECT: SC 479 (S-10)

The Response of Sire Progenies to Management and Feeding Procedures

II. OBJECTIVES:

1. To investigate the response of sire progenies, as measured by live animal and carcass traits, to methods of producing slaughter cattle.
2. To evaluate the magnitude and importance of the average genotype with certain environmental influences.
3. To develop through selection herds of beef cattle with superior performance under South Carolina conditions.

III. PERSONNEL:

W. C. Godley, H. H. Pierce, D. H. Kropf, Mary J. Marbut, R. M. Rauton, R. R. Ritchie and J. H. Mitchell, Jr.

IV. ACCOMPLISHMENTS DURING THE YEAR:

- A. One hundred and thirty-nine of the one hundred fifty-five calves produced during the 1960 calving season were raised to weanling. The fifty-one purebred Hereford calves were the progeny of four bulls, and the eighty eight purebred Angus calves were sired by six bulls. One of the Hereford bulls completed a two-year cycle and was eliminated from the project because of the performance of his offspring. A second Hereford sired a dwarf calf and was sent to slaughter. A third Hereford bull on loan from the Georgia Station was returned. Arrangements were made to replace these three bulls. Two bulls were purchased, one was obtained as a gift, and a South Carolina breeder provided a breeding interest in a fourth bulls. Two Angus bulls that had completed two-year cycles were removed from the project. Only one of these was replaced. Due to the number of replacements available, some selection of the Angus females composing the breeding herds was possible.
- B. Five Angus bull calves representing three sires were selected as possible herd sires and were fed on a R.O.P. feeding test.
- C. Nineteen Angus and thirteen Hereford steers representing nine sire groups that were calved in 1959 were fed for approximately 136 days after weaning. Steers within sire groups were randomly assigned to three treatments: forage, forage plus grain and drylot. These steers were slaughtered and detailed carcass data were obtained.

V. FUTURE PLANS:

The project will continue as outlined in the project statement. Emphasis will be placed on increasing the size of the Hereford herds. Increased attention to performance will be emphasized in selecting replacement females for the Angus herds.

VI. PUBLICATIONS:

None

VII. PUBLICATIONS PLANNED:

Technical article reporting the results of least squares analyses of birth and weanling weights is planned.

PERFORMANCE OF COW HERDS. 1960 CALVES

South Carolina Agricultural Experiment Station

Location Line or group Breed of sire Breed of dam	Clemson J.M. Hereford Hereford	Clemson RFPD 57 Hereford Hereford	Clemson D. D. Hereford Hereford	Clemson C. A. Angus Angus	Clemson C. K. Angus Angus	Clemson B. Im. Angus Angus
No. cows calving	14	14	2	14	14	5
No. calves raised	13	14	2	12	14	4
Av. birth date	2/9/60	2/7/60	1/6/60	1/27/60	1/18/60	1/19/60
Av. birth wt. (lbs.)	79.4	74.5	54.5	55.9	55.6	57.0
Av. weaning age	210.6	209.7	209.0	211.3	211.4	211.5
Av. weaning wt.	402.5	401.7	420.0	432.1	416.1	341.2
Av. weaning type score	10.3	10.9	11.5	11.0	11.1	10.3
Were calves creep fed?	*	*	*	*	*	*
Adjusted(1) av. daily gain from birth to weaning	1.58	1.66	1.93	1.88	1.78	1.56

(1) Adjusted for sex, age of dam, and creep feeding.

* One-half of the calves in each group were creep fed.

PERFORMANCE OF COW HERDS. 1960 CALVES

South Carolina Agricultural Experiment Station

Location Line or group Breed of sire Breed of Dam	Summerville G. M. Hereford Hereford	Summerville D. D. Hereford Hereford	Summerville C. E. L. Angus Angus	Summerville G-34 Angus Angus	Summerville B. Im. Angus Angus	Summerville G-14 Angus Angus
No. cows calving	20	7	4	25(1)	11	24
No. calves raised	18	4	2	23	10	23
Av. birth date	1/10/60	2/15/60	3/5/60	1/18/60	1/6/60	1/23/60
Av. birth wt. (lbs.)	66.0	65.3	57.0	66.9	52.5	67.9
Av. weaning age	209.4	202.8	200.5	209.2	210.1	204.9
Av. weaning wt.	356.1	370.5	311.0	417.8	340.5	386.3
Av. weaning type score	10.4	11.8	10.1	11.8	10.9	11.3
Were calves creep fed?	*	*	*	*	*	*
Adjusted(2) av. daily gain from birth to weaning	1.47	1.65	1.53	1.77	1.56	1.59

SC (4)

(1) Twin calves born to one cow.

(2) Adjusted for sex, age of dam and creep feeding.

* One-half of the calves in each group were creep fed.

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
(or pastured for high gains)

South Carolina Agricultural Experiment
Station

Location	Clemson	Clemson	Clemson	Clemson	Clemson
Line or group	C. A.	B. Im.	G-14	G-34	C. K.
Breed of sire	Angus	Angus	Angus	Angus	Angus
Breed of dam	Angus	Angus	Angus	Angus	Angus
BULLS, No.	1	1	3		1
Av. initial age (days)	218	219	212		232
Av. initial wt. (lbs.)	540	505	540		540
Av. no. days on feed	136	136	128		136
Av. final weight	810	780	807		820
Av. daily gain	1.99	2.02	2.09		2.06
Av. Score					
Conformation	9.7	11.3	10.2		--
feeding regime	- - - - -	- - Group fed	- ad lib -	- - - - -	- - - - -
STEERS, No.	3	5	3	1	4
Av. initial age (days)	296.0	290.4	276.3	309.0	298.8
Av. initial wt. (lbs.)	523.3	533.0	546.7	640.0	540.0
Av. no. days on feed	131.3	155.6	146.3	128.0	144.3
Av. final weight	726.7	772.0	796.7	810.0	755.0
Av. daily gain	1.55	1.55	1.71	1.33	1.47
Av. score					
Conformation	8.6	9.5	8.5	8.3	8.5
Feeding regime	*	*	*	*	*

* Steers within sire groups were randomly assigned to three treatments:
forage, forage + grain and dry lot.

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
(or pastured for high gains)

South Carolina Agricultural Experiment Station

Location Line or group Breed of sire Breed of dam	Clemson Evad. Angus Angus	Clemson D. D. Hereford Hereford	Clemson G. M. Hereford Hereford	Clemson J. M. Hereford Hereford
BULLS, No.	1		1	
Av. initial age (days)	209		211	
Av. initial wt. (lbs.)	465		570	
Av. no. days on feed	136		136	
Av. final weight	765		730	
Av. daily gain	2.21		1.18	
Av. score				
Conformation	12.0		9.7	
Feeding regime	- - - - -	Group fed - ad lib	- - - - -	- - - - -
STEERS, No.	3	5	5	3
Av. initial age (days)	302.7	310.6	269.2	316.0
Av. initial wt. (lbs.)	511.7	504.0	516.0	450.0
Av. no. days on feed	168.3	149.2	159.8	158.0
Av. final weight	750.0	746.0	815.0	695.0
Av. daily gain	1.42	1.62	1.85	1.53
Av. score				
Conformation	9.7	8.9	9.1	7.9
Feeding regime	*	*	*	*

* Steers within sire groups were randomly assigned to three treatments:
forage, forage + grain and dry lot.

DATA ON ANIMALS SLAUGHTERED

South Carolina Agricultural Experiment Station

Location Herd	Clemson C. A.	Clemson B. Im.	Clemson G-14	Clemson G-34	Clemson C. K.
Breed of sire	Angus	Angus	Angus	Angus	Angus
Breed of dam	Angus	Angus	Angus	Angus	Angus
Sex	Steer	Steer	Steer	Steer	Steer
No. slaughtered	3	5	3	1	4
Age at slaughter	405.0	453.8	429.7	446.0	450.8
Time in feedlot (days)	131.3	155.6	146.3	128.0	144.3
Gain in feedlot (lbs.)	203.3	239.0	250.0	170.0	215.0
Final feedlot weight	726.7	772.0	796.7	810.0	755.0
Slaughter weight ⁽¹⁾	711.3	756.4	773.0	775.0	736.0
Carcass weight ⁽²⁾	422.7	451.6	448.0	483.0	433.5
Dressing percentage ⁽³⁾	59.19	59.62	58.00	62.32	58.76
Slaughter grade	8.6	9.5	8.5	8.3	8.5
Carcass grade	8.7	10.2	9.3	11.0	9.8
Rib eye area (sq.in.)	8.96	9.48	9.36	8.86	10.29
W-B Shear					
Core size	1"	1"	1"	1"	1"
Shear Force (lbs.)	16.7	13.6	13.9	9.9	14.4
9-10-11 Rib Section					
Weight in lbs.	6.6	6.7	7.0	7.7	6.5
% fat	34.18	36.00	29.17	36.36	28.49
% lean	49.30	49.22	51.39	46.75	55.10
% bone	16.52	14.77	18.90	16.88	16.41
% cooking loss	24.0	22.2	21.3	24.8	21.8
Roast score ⁽⁴⁾	6.76	7.30	6.93	7.55	7.15
Steak score ⁽⁴⁾	6.60	7.23	7.29	6.80	7.17

⁽¹⁾Off feed 24 hours prior to slaughter - access to water.⁽²⁾Hot carcass.⁽³⁾Weight at slaughter and hot carcass weight.⁽⁴⁾Hedonic scale.

DATA ON ANIMALS SLAUGHTERED

South Carolina Agricultural Experiment Station

Location Herd	Clemson Evad.	Clemson D. D.	Clemson G. M.	Clemson J. M.
Breed of sire	Angus	Hereford	Hereford	Hereford
Breed of dam	Angus	Hereford	Hereford	Hereford
Sex	Steer	Steer	Steer	Steer
No. slaughtered	3	5	5	3
Age at slaughter	477.0	467.8	435.8	481.7
Time in feedlot (days)	168.3	149.2	159.8	158.0
Gain in feedlot (lbs.)	238.3	242.0	299.0	245.0
Final feedlot weight	750.0	746.0	815.0	695.0
Slaughter weight ⁽¹⁾	748.0	745.2	800.6	690.3
Carcass weight ⁽²⁾	442.3	427.2	478.8	389.7
Dressing percentage ⁽³⁾	59.10	57.13	59.84	56.50
Slaughter grade	9.7	8.9	9.1	7.9
Carcass grade	10.0	8.0	8.6	7.7
Rib eye area (sq.in)	8.52	8.45	9.91	9.72
W-B Shear				
Core size	1"	1"	1"	1"
Shear force (lbs.)	12.6	18.5	13.4	16.9
9-10-11 Rib Section				
Weight in lbs.	6.5	6.0	7.0	5.5
% fat	38.29	26.09	31.04	20.01
% lean	45.57	56.08	53.79	60.73
% bone	16.13	17.83	15.17	19.26
% cooking loss	24.5	22.7	21.6	22.1
Roast score ⁽⁴⁾	7.37	6.32	7.29	6.69
Steak score ⁽⁴⁾	6.83	5.98	7.26	6.38

(1) Off feed 24 hours prior to slaughter - access to water.

(2) Hot carcass.

(3) Weight at slaughter and hot carcass weight.

(4) Hedonic scale.

Tennessee Station

by

C. S. Hobbs

I. PROJECT: Hatch 61 (S-10)

The Improvement of the Producing Ability of Beef Cattle.

II. OBJECTIVES:

- A. To develop lines or line crosses, or combinations of lines and crosses of beef cattle which will make the most efficient use of Tennessee pastures and forages and that will result in an improvement of such characters as rate of gain, economy of gain, carcass quality, fertility and longevity.
- B. To develop effective breeding techniques for the improvement of existing lines of beef cattle.
- C. To investigate the productivity of existing lines of beef cattle.
- C. To investigate the effect of different levels of nutrition on the development of type and conformation, on economy of gain, fertility and longevity.

III. PERSONNEL:

C. S. Hobbs, R. J. Cooper, R. E. Dodson, H. J. Smith, C. M. Kincaid, J. W. Cole, C. B. Ramsey, J. B. McLaren, R. A. Reynolds, W. H. Walker, J. H. Felts, J. A. Odom, B. L. Whittenburg and L. Safley.

IV. ACCOMPLISHMENTS DURING THE YEAR:

Performance records from birth to weaning were collected on about 800 calves. A comparison between weights and grades at about four months and at weaning indicate a close relationship. These data include performance records on progeny of 36 Hereford sires at six locations and 20 Angus sires at four locations. Weights, type and condition grades are being collected on cows at some locations to obtain basic data on mature size, variation in condition at different seasons, between locations and between years. Cows are weighed and graded for type and condition at weaning time. Replacement heifers are weighed and graded for type and condition as yearlings and each fall at weaning time to obtain growth and development data.

During 1960, 140 Hereford heifers in the UT-AEC project were allotted into five uniform groups and irradiated at the following levels: 0, 200r, 300r, 400r and 600r (in two 300r exposures) doses. Another 140 heifers have been secured to be irradiated in 1961 at the same levels. Two hundred survivors (approximately 20 at each level) will be used to obtain progeny test information on 8 bulls per year.

Thirty-eight Angus and Hereford bull calves from various stations were used to compare four methods of developing herd bulls from weaning age to approximately

twenty months of age. Thirty-six Angus bull calves were fed from weaning to approximately twenty months of age to obtain performance data on the individuals and sire progenies.

Carcass data were secured on 54 yearling Hereford steers by 9 sires from one station, 12 yearling Hereford steers by 3 sires from another station, and from 23 yearling Angus steers by 5 sires from another station. Detailed carcass data have been obtained on 3 steer progeny from each of 6 sires in cooperation with the Types and Breeds project. Individual IBM cards for analysis of data for present and previous years have been made for pre-weaning, weaning, yearling heifers and cow records.

Individual calf records have been processed on 1550 calves and summaries by sire progeny and herds have been made for 53 breeders in a cooperative program with extension.

V. FUTURE PLANS:

Continue present work on getting data on all sire and dam progeny in tests at approximately 120-140 days and at weaning time. Obtain weights and condition grades on cows at approximately November 1, January 1, and July 1.

Continue studying present and new methods of breeding systems and developing of lines at different stations.

Expand the carcass evaluation and consumer acceptance phases.

Adapt all records to IBM system for more rapid and detailed statistical analysis and studies.

VI. PUBLICATIONS DURING THE YEAR:

Ranganathan, M. P. 1960. Relationship of Sires to Eating Quality of Beef. M. S. Thesis. University of Tennessee

Hobbs, C. S., R. J. Cooper, J. M. Anderson and C. M. Kincaid. 1961. Four Methods of Developing Bulls to Approximately 20 Months of Age. 58th Annual Proc. Assoc. Southern Agri. Workers.

* * * * *

I. PROJECT: Hatch 65 (S-10)

The Detection of Animals Heterozygous for Recessive Bovine Dwarfism.

II. OBJECTIVES:

To investigate methods of identifying animals heterozygous for recessive bovine dwarfism.

III. PERSONNEL:

R. J. Cooper, C. S. Hobbs, C. M. Kincaid, H. J. Smith, R. A. Reynolds, John Leeman and R. E. Dodson.

IV. ACCOMPLISHMENTS DURING THE YEAR:

A group of 30 pedigree clean Hereford cows is being maintained with half of them mated artificially to a dwarf bull and the others mated to a pedigree clean bull each year. In 1960, 8 carrier and 19 clean calves were produced from these matings.

The osmotic fragility of the red blood cells of these calves and three dwarfs was at one week, four months and six and one half months of age. The results given below revealed little difference between genotypes, although more hemolysis was observed at four months and six and one half months than at one week of age.

Percent Light Transmission Through 0.1 ml. Blood
Hemolysed in 20 ml. 0.56 Percent Saline

Age and sex Group	Genotype					
	Dwarf		Carrier		Clean	
	No.	Av.	No.	Av.	No.	Av.
0-14 day old						
Males	2	56	4	55	10	55
Females	1	36	4	64	9	62
120-140 day old						
Males	-	-	4	38	10	29
Females	1	70	4	21	9	30
190-210 day old						
Males	2	35	4	41	10	37
Females	1	71	4	38	9	40

Body measurements were taken on the carrier and clean calves at the same ages the blood samples were obtained. The carrier calves were heavier, taller at the withers, had slightly wider heads and larger cannon circumference than the clean calves of the same sex. X-rays were taken on 36 calves at about one week of age, also.

Parathyroid hormone was administered intravenously at two levels to 8 carrier and 8 clean calves with 8 other clean calves serving as controls. Blood samples taken periodically following the injection of the hormone failed to show an effect of the hormone on the level of calcium, inorganic phosphorus, alkaline phosphatase, or citric acid in the serum.

Sixty known carrier cows were used to progeny test bulls for dwarfism at two locations.

V. FUTURE PLANS:

The group of 30 pedigree clean Hereford cows is being maintained with half of them mated to a dwarf bull and half of them mated to a clean bull each year. X-rays and body measurements will be taken on the calves from these matings as they have been previously. Other possible methods of detecting carriers will also be investigated.

The 60 carrier cows will continue to be used to progeny test bulls for dwarfism.

VI. PUBLICATIONS:

None.

PERFORMANCE OF COW HERDS. 1960 CALVES
Tennessee Station

Location Line or group Breed of sire Breed of dam	Alcoa 9533 Hereford Hereford	Alcoa 9156 Hereford Hereford	Alcoa 9075 Hereford Hereford	Alcoa 9023 Hereford Hereford	Alcoa 9505 Hereford Hereford	Alcoa 9484 Hereford Hereford
No. cows calving	27	21	18	19	18	20
No. calves raised	22 (1)*	14 (4)*	15 (1)*	15(1)*	15	8 (8)*
Av. birth date	2-22-60	2-15-60	2-13-60	2-21-60	2-20-60	4-9-60
Av. birth wt. (lbs.)	70	77	76	70	81	69
Av. weaning age	252	258	260	254	255	206
Av. weaning wt.	492	528	520	481	562	419
Av. weaning type score	11.9	12.8	11.6	11.8	13.2	11.9
Av. weaning condition score	9.6	10.4**	9.8**	9.3	9.7	9.2
Were calves creep fed?	No	No	No	No	No	No
Adjusted (1) av. daily gain from birth to weaning	1.80	1.85	1.82	1.76	1.92	2.01

(1) Adjusted for sex and age of dam.

*Number in parenthesis indicates calves not included as raised because they were sold, raised on foster dams, or transferred to another project before the weaning data were obtained.

**One calf not graded.

PERFORMANCE OF COW HERDS. 1960 CALVES

Tennessee Station

Location Line or group Breed of sire Breed of dam	Alcoa 1167 Angus Angus	Alcoa 9137 Angus Angus	Alcoa 9618 Hereford Hereford	Alcoa 9264 Hereford Hereford	Alcoa 9513 Hereford Hereford	Alcoa 2892 Hereford Hereford
No. cows calving	6	5	18	23	20	21
No. calves raised	4 (1)*	1	10 (5)*	19 (2)*	18	16 (1)*
Av. inbr. of calves (%)		25				
Av. birth date	2-17-60	2-23-60	2-8-60	2-19-60	2-14-60	2-13-60
Av. birth wt. (lbs.)	72	54	77	80	71	80
Av. weaning age	257	251	266	255	261	196
Av. weaning wt.	508	416	558	519	527	436
Av. weaning type score	13.5	13.0	12.4	12.0	12.3	11.8
Av. weaning condition score	11.5	10.0	9.8	9.8	10.5	9.0
Were calves creep fed?	No	No	No	No	No	No
Adjusted ⁽¹⁾ av. daily gain from birth to weaning	1.80	1.83	1.88	1.84	1.85	1.91

(1) Adjusted for sex and age of dam.

* Number in parenthesis indicates calves not included as raised because they were sold, raised on foster dams or transferred to another project before the weaning data were obtained.

PERFORMANCE OF COW HERDS. 1960 CALVES

Tennessee Station

Location Line or group Breed of sire Breed of dam	9506 Hereford Hereford	9023 Hereford Hereford	1167 Angus Angus	9137 Angus Angus	9533 Hereford Hereford	9702 Fall Angus Angus	9506 Fall Hereford Hereford
No. cows calving	13	6	23	5	1	3	8
No. calves raised	8 (4)*	2 (1) *	17 (5)*	1	1	3	7
Av. inbr. of calves (%)	-	-	-	25	-	-	-
Av. birth date	3-5-60	4-9-60	2-20-60	3-10-60	5-9-60	9-23-59	9-30-59
Av. birth wt. (lbs.)	62	58	66	54	55	50	62
Av. weaning age	240	206	258	235	206	241	-
Av. weaning wt.	396	290	487	405	290	428	-
Av. weaning type score	11.4	11.5	12.8	12.0	11.5	12.2	-
Av. weaning condition score	9.0	7.8	10.5	9.5	7.8	-	-
Were calves creep fed?	No	No	No	No	No	-	-
Adjusted (1) av. daily gain from birth to weaning	1.52	1.27	1.73	1.64	1.27	1.81	-

(1) Adjusted for sex and age of dam.

* Number in parenthesis indicates calves not included as raised because they were sold, raised on foster dams or transferred to another project before the weaning data were obtained.

PERFORMANCE OF COW HERDS. 1960 CALVES

Tennessee Station

Location Line or group Breed of sire Breed of dam	9988 P. Hereford Hereford	3180 P. Hereford Hereford	Oak Ridge 1068 Hereford Hereford	9119 P. Hereford Hereford	9351 P. Hereford Hereford	6653 Hereford Hereford
No. cows calving	20	18	16	19	18	15
No. calves raised	19	11 (3)*	10 (5)*	15 (1)*	14 (2)*	12
Av. birth date	2-26-60	2-19-60	2-26-60	2-13-60	2-17-60	2-9-60
Av. birth wt. (lbs.)	62	70	64	65	66	71
Av. weaning age	255	247	231	253	244	248
Av. weaning wt.	491	472	422	467	476	437
Av. weaning type score	10.8	10.8	11.6	11.2	11.5	11.1
Av. weaning condition score	9.2	8.8	8.9	8.9	9.0	8.4
Were calves creep fed?	No	No	No	No	No	No
Adjusted (1) av. daily gain from birth to weaning	1.80	1.74	1.74	1.71	1.78	1.54

(1) Adjusted for sex and age of dam.

* Number in parenthesis indicates calves not included as raised because they were sold, raised on foster dams or transferred to another project before the weaning data were obtained.

PERFORMANCE OF COW HERDS. 1960 CALVES
Tennessee Station

Location Line or group Breed of sire Breed of dam	9983 P. Hereford Hereford	3224 Hereford Hereford	Oak Ridge 9755 P. Hereford Hereford	6432 Hereford Hereford	9407 P. Hereford Hereford
No. cows calving	19	9	18	19	23
No. calves raised	14 (3) *	8	16 (2)*	17 (1)*	21 (2)*
Av. birth date	2-5-60	2-22-60	2-12-60	2-22-60	3-6-60
Av. birth wt. (lbs.)	61	69	69	66	56
Av. weaning age	264	259	251	245	221
Av. weaning wt.	466	550	501	462	363
Av. weaning type score	10.7	11.9	11.4	11.0	11.8
Av. weaning condition score	8.7	9.8	9.2	8.7	8.8
Were calves creep fed?	No	No	No	No	No
Adjusted (1) av. daily gain from birth to weaning	1.64	1.98	1.85	1.72	1.66

(1) Adjusted for age and sex of dam.

* Number in parenthesis indicates calves not included as raised because they were sold, raised on foster dams or transferred to another project before the weaning data were obtained.

PERFORMANCE OF COW HERDS. 1960 CALVES

Tennessee Station

Location Line or group Breed of sire Breed of dam	9186 Angus Angus	5244 Angus Angus	9702 Angus Angus	Crossville 5148 Angus Angus	5026 Angus Angus	5063 Angus Angus
No. cows calving	9	20	26	21	21	12
No. calves raised	8	18	23	14 (4)*	17	9
Av. birth date	3-31-60	3-22-60	3-17-60	3-3-60	2-24-60	3-12-60
Av. birth wt. (lbs.)	65	65	57	60	64	53
Av. weaning age	216	225	230	244	252	235
Av. weaning wt.	386	428	424	435	487	403
Av. weaning type score	10.4	11.1	12.0	12.0	10.8	11.5
Av. weaning condition score	8.3	8.8	9.3	9.3	8.6	9.5
Were calves creep fed?	No	No	No	No	No	No
Adjusted (1) av. daily gain from birth to weaning	1.61	1.80	1.82	1.68	1.79	1.65

(1) Adjusted for sex and age of dam.

* Number in parenthesis indicates calves not included as raised because they were sold, raised on foster dams or transferred to another project before the weaning data were obtained.

PERFORMANCE OF COW HERDS. 1960 CALVES

Tennessee Station

Location Line or group Breed of sire Breed of dam	-- -- -Greeneville -- -- -- 9118 P. Hereford P. Hereford	-- -- -- 9162 P. Hereford P. Hereford	Springfield 9217 Hereford Hereford	Columbia 4033 Hereford Hereford	Columbia 2825 Hereford Hereford
No. cows calving	18	1	34	22	25
No. calves raised	16	1	33	20 (1)*	21
Av. birth date	3-8-60	1-11-60	3-3-60	2-17-60	2-8-60
Av. birth wt. (lbs.)	67	76	67	71	67
Av. weaning age	252	287	235	232	241
Av. weaning wt.	418	600	458	433	427
Av. weaning type score	10.9	12.5	11.7	11.6	11.2
Av. weaning condition score	7.9	9.0	9.1	9.4	8.9
Were calves creep fed?	No	No	No	No	No
Adjusted(1) av. daily gain from birth to weaning	1.54	1.88	1.78	1.67	1.59

(1) Adjusted for sex and age of dam.

*Number in parenthesis indicates calves not included as raised because they were sold, raised on foster dams or transferred to another project before the weaning data were obtained.

PERFORMANCE OF COW HERDS. 1960 CALVES

Tennessee Station

Location Line or broup Breed of sire Breed of dam	Columbia 2014 Hereford Hereford	Ames 9295 Angus Angus	Ames 9385 Angus Angus	Ames 1084 Angus Angus	Ames 9291 Angus Angus	Ames 9380 Angus Angus	Ames 9305 Angus Angus
No. cows calving	9	31	30	15	23	9	6
No. calves raised	5 (1)*	24 (4)*	27 (3)*	14 (1)*	22	7 (2)*	6
Av. birth date	2-23-60	2-12-60	2-14-60	2-22-60	2-13-60	2-4-60	2-23-60
Av. birth wt. (lbs.)	56	55	60	60	54	55	57
Av. weaning age	226	242	239	232	240	249	230
Av. weaning wt.	330	408	436	445	391	440	442
Av. weaning type score	9.7	11.8	12.1	12.1	11.1	12.1	13.2
Av. weaning condition score	8.4	10.3	9.8	9.6	9.8	10.9	10.8
Were calves creep fed?	No	No	No	No	No	No	No
Adjusted (1) av. daily gain from birth to weaning	1.47	1.56	1.67	1.76	1.53	1.69	1.80

(1) Adjusted for sex and age of dam.

* Number in parenthesis indicates calves not included as raised because they were sold, raised on foster dams or transferred to another project before the weaning data were obtained.

PERFORMANCE OF COW HERDS. 1960 CALVES
Tennessee Station

Location Line or group Breed of sire Breed of dam	Ames 8090 Angus Angus	Ames 9777 Angus Angus	Ames 8657 Angus Angus	Ames 5097 Angus Angus	Ames 9537 Angus Angus	Ames 9148 Angus Angus
No. cows calving	12	10	9	4	6	4
No. calves raised	7 (1)*	7 (1)*	6	4	1 (2)*	4
Av. birth date	2-20-60	2-15-60	2-8-60	2-3-60	2-23-60	3-10-61
Av. birth wt. (lbs.)	50	51	50	55	52	68
Av. weaning age	233	238	246	250	230	214
Av. weaning wt.	382	402	408	401	330	489
Av. weaning type score	11.1	11.9	11.1	10.1	10.5	13.9
Av. weaning condition score	9.9	8.6	8.9	8.4	10.0	9.4
Were calves creep fed?	No	No	No	No	No	No
Adjusted (1) av. daily gain from birth to weaning	1.63	1.70	1.67	1.57	1.48	2.00

(1) Adjusted for sex and age of dam.

* Number in parenthesis indicates calves not included as raised because they were sold, raised on foster dams or transferred to another project before the weaning data were obtained.

PERFORMANCE OF COW HERDS. 1960 Calves

Tennessee Station

Location Line or group Breed of sire Breed of dam	Ames 9295 Fall Angus Angus	Ames 9380 Fall Angus Angus	Ames 9291 Fall Angus Angus	Ames 00 Fall Angus Angus
No. cows calving No. calves raised	26 20 (4)*	24 22	15 13	12 5
Av. birth date Av. birth wt. (lbs.) Av. weaning age Av. weaning wt. Av. weaning type score Adjusted (1) av. daily gain from birth to weaning	9-22-59 58 267 402 .11.0 1.38	9-27-59 61 262 484 12.0 1.70	10-2-59 50 257 393 11.3 1.48	12-1-59 57 268 409 10.9 1.53

(1) Adjusted for sex and age of dam.

* Number in parenthesis indicates calves not included as raised because they were sold, raised on foster dams or transferred to another project before the weaning data were obtained.

DATA ON ANIMALS SLAUGHTERED

Tennessee Station

Location Herd	Alcoa Lot 1	Alcoa Lot 1 A	Alcoa Lot II	Alcoa Lot IIA
Breed of sire	Hereford	Hereford	Hereford	Hereford
Breed of dam	- - - - -	- Hereford and H X A - - - - -	- - - - -	- - - - -
Sex	Steers	Steers	Steers	Steers
No. slaughtered	27	8	25	9
Age at slaughter	586	596	636	592
Time in feedlot (days)	155	155	113	64
Gain in feedlot (lbs.)	386	350	288	163
Final feedlot weight	998	1026	1031	939
Slaughter weight ⁽¹⁾				
Carcass weight ⁽²⁾	600	627	582	530
Dressing percentage ⁽³⁾	60.1	61.0	56.4	56.4
Slaughter grade	11.3	12.2	10.2	10.0
Carcass grade	10.2	12.9	9.6	10.7
Fat thickness over rib eye (ins.)	0.42	0.62	0.40	0.42
Rib eye area (sq.in.)	11.05	11.16	10.51	9.95
W-B Shear				
Core size	1 inch	1 inch	1 inch	1 inch
Shear Force (lbs.)	16.77	19.38	16.00	18.72
Marbling Score ⁽⁴⁾	4.4	6.9	4.0	4.7

(1) Same as final feedlot weight. An average of weights taken on two consecutive days at end of feeding period.

(2) Hot carcass weight less 2 1/2%.

(3) Chilled carcass weight X 100/ final feedlot weight.

(4) Scores range from 1 for devoid of marbling to 12 for extremely abundant marbling.

TENN (16)

DATA ON ANIMALS SLAUGHTERED

Tennessee Station

Location	----- Crossville -----				
Herd	5026	5063	9186	5226	5244
Breed of sire	Angus	Angus	Angus	Angus	Angus
Breed of dam	Angus	Angus	Angus	Angus	Angus
Sex	Steer	Steer	Steer	Steer	Steer
No. slaughtered	6	7	2	3	5
Carcass weight	561.8	557.3	569.9	522.5	518.3
Carcass grade	11.50	10.86	11.0	11.0	11.40
Fat thickness over rib eye (ins.)	.4	.4	.3	.4	.3
Rib eye area (sq.in.)	10.96	10.44	11.12	11.60	10.73
W-B Shear					
Shear Force (lbs.)	14.95	15.21	13.50	17.42	16.78

Location	Greeneville	Greeneville	Greeneville
Herd	9717	9983	3180
Breed of sire	P. Hereford	P. Hereford	P. Hereford
Breed of dam	P. Hereford	P. Hereford	P. Hereford
Sex	Steer	Steer	Steer
No. slaughtered	4	4	4
Slaughter weight	899	1022	1002
Carcass weight	511	575	558
Carcass grade	10.0	9.0	9.2
Fat thickness over rib eye (ins.)	.36 ⁽¹⁾	.36 ⁽¹⁾	.32
Rib eye area (sq.in.)	10.30 ⁽¹⁾	12.42 ⁽¹⁾	11.12
W-B Shear			
Shear force (lbs.)	15.77 ⁽¹⁾	18.03 ⁽¹⁾	15.42

(1) Information for three animals only.

TENN (17)

PERFORMANCE DATA ON YEARLING OR OLDER CATTLE NOT IN BREEDING
HERDS IN 1959

Location	Alcoa	Alcoa	Alcoa	Alcoa	Ames
Line or group	Lot I	Lot IA	Lot II	Lot IIA	-
Breed of sire	Hereford	Hereford	Hereford	Hereford	Angus
Breed of dam	Hereford and	Hereford x Angus	- - - -	- - - -	Angus
Sex	Steers	Steers	Steers	Steers	Female
Number	27 ⁽¹⁾	8	25	9	62
Initial					
Date	10-7-59	10-9-59	10-8-59	10-11-59	10-31-59
Age (days)	228	241	230	240	253
Weight(lbs.)	477	513	495	491	419
Score					
Conformation	12.2	11.6	12.2	11.9	11.5
Condition	9.3	10.1	9.5	9.7	10.1
First period	- - - - All Wintered Together - - - -				
Feeding regime	(5 lb. conc., 25-35 lb. silage, 4-5 lb. mixed hay)				
No. days	202	200	201	198	170
Gain per head	135	163	123	157	43
Gain per day	0.67	0.82	0.61	0.79	0.25
Second period	Self fed grain and hay				
Feeding regime	on pasture		- - Pasture only - - - -		
No. days	91	91	91	91	
Gain per head	250	232	125	128	
Gain per day	2.75	2.55	1.37	1.41	
Third period	Self fed grain and hay				
Feeding regime	on pasture.		Fed grain and hay in dry lot.		
No. days	64	64	113	64	
Gain per head	136	118	288	163	
Gain per day	2.12	1.84	2.55	2.55	
Final					
Date	9-28-60	9-28-60	11-16-60	9-28-60	4-18-60
Age	586	596	635	592	423
Weight	998	1026	1031	939	448
Score					
Conformation					11.1
Condition	11.3	12.2	10.2	10.0	5.7
Gain per day of age	1.58	1.60	1.51	1.47	0.93

(1) Initial data available on 26 animals only.

TENN (18)

PERFORMANCE DATA ON YEARLING OR OLDER CATTLE NOT IN BREEDING
HERDS IN 1959

Location	Oak Ridge	Springfield	Columbia	Alcoa	Alcoa (Oak Ridge)
Line or group					
Breed of sire	Hereford	Hereford	Hereford	Hereford	Hereford
Breed of dam	Hereford	Hereford	Hereford	Hereford	Hereford
Sex	Female	Female	Female	Female	Female
Number	32	17	20	42	43
Initial					
Date	10-13-59	10-21-59	10-25-59	10-8-59	10-11-59
Age (days)	231	224	225	226	232
Weight (lbs.)	423	423	327	441	453
Score					
Conformation	11.7	11.6	10.6	11.6	12.0
Condition	10.0	9.9	7.8	9.9	10.0
First Period					
No. days	176	163	164	170	193
Gain per head	230	161	181	151	115
Gain per day	1.31	0.99	1.10	0.89	0.60
Final					
Date	4-6-60	4-1-60	4-6-60	3-27-60	4-21-60
Age	406	387	394	397	424
Weight	653	584	508	590	568
Score					
Conformation	11.0	12.2	11.6	11.6	11.1
Condition	7.9	6.9	4.2	8.5	6.8
Gain per day of age	1.46	1.34	1.12	1.31	1.17

PERFORMANCE DATA ON YEARLING OR OLDER CATTLE NOT IN BREEDING
HERDS IN 1960

Location	Knoxville	Knoxville	Knoxville	Knoxville	Ames
Line or group	AA	AB	BA	BB	
Breed of sire	Herefords and Angus - - - - -				Angus
Breed of dam	Herefords and Angus - - - - -				Angus
Sex	Bulls	Bulls	Bulls	Bulls	Bulls
Number	11	9	9	9	32
Initial					
Date	11-19-59	11-19-59	11-19-59	11-19-59	10-31-60
Age (days)	271	256	265	274	257
Weight (lbs.)	558	577	573	595	470
Score					
Conformation	13.3	12.4	12.9	12.9	12.1
Condition	9.4	9.2	8.9	9.1	-
First period	FF Conc.	FF Conc.	5 lb. Conc.	5 lb. Conc.	5 lb. Conc.
Feeding regime	lim. Silage	Lim. Silage	FF Silage	FF Silage	FF Silage
No. days	140	140	140	140	-
Gain per head	291	279	254	250	-
Gain per day	2.08	1.99	1.81	1.79	-
Second period					
Feeding regime	Pasture and Grain	Pasture Only	Pasture and Grain	Pasture Only	Pasture Only
No. days	84	84	84	84	242*
Gain per head	111	42	147	52	265
Gain per day	1.33	0.50	1.75	0.62	1.09
Third period					
Feeding regime	FF Conc.	FF Conc.	FF Conc.	FF Conc.	FF Conc.
No. days	98	98	98	98	98
Gain per head	214	260	251	260	269
Gain per day	2.19	2.65	2.56	2.65	2.75
Final					
Date	10-6-60	10-6-60	10-6-60	10-6-60	10-6-60
Age	593	578	587	596	598
Weight	1174	1138	1225	1157	1009
Score					
Conformation	12.8	12.6	13.2	11.8	11.9
Condition	10.1	9.1	10.3	9.7	-
Gain per day of age	1.98	1.97	2.08	1.95	1.52

* First and second periods summarized together.

Texas Station

by

T. C. Cartwright

I. PROJECT: Animal Husbandry 650. (S-10) (AHRD d1-22)

The improvement of Production and Desirability of Beef Through Breeding Methods.

II. OBJECTIVES:

- A. To estimate and further test by selection and breeding, genetic prapmeters including heritability, heterotic effect and genetic correlations for:
 - 1. Weaning weight.
 - 2. Post-weaning feedlot and pasture gain.
 - 3. Gain during the summer months.
 - 4. Beef value of the carcass including distrivution of carcass weight among various cuts and muscle, fat and bone.
 - 5. Eating desirability of the beef.
 - 6. Other characters as their possible importance becomes evident.
- B. To test breeds and strains of unknown or unrecorded productivity.
- C. To develop procedures and techniques adequate for practical applica-
tion in:
 - 1. Record keeping.
 - 2. Artificial insemination.
 - 3. Other areas involved in management that present an obvious need in a breeding program.

III. ACCOMPLISHMENTS DURING THE YEAR:

A punched card record keeping system was developed for use by breeders in keeping and utilizing performance records for selection. The system is now in use in two large herds with a commercial tabulating service processing the data on a fee basis. The method appears to be a very marked economic improvement for herds of 200 head or more compared with conventional record keeping.

Data from the Essar Angus Ranch sale were analyzed to estimate the extent to which buyers were influenced by production records of 139 bulls. Average sale price was \$885. Approximately 31% of the differences in sale price were accounted for by differences in daily gain, live weight, ares of ribeye muscle estimated by ultrasonic device, weaning weight, estimated (ultrasonic) fat depth, age in days and lean per hundred weight. The contribution of the last three measurements made no statistically significant additional contribution. The adjusted multiple correlation coefficient dropped to 30% when they were excluded.

TEX (2)

Partial correlation coefficients between sale price and five of the variables were computed. Each value in the table below represent the correlation between the indicated pair of variables independent of all of the remaining variable listed in the table.

Variable	Sale Price
Weaning weight	.19*
Daily gain	.28**
Initial weight	.25**
Fat depth	-.18 *
Ribeye area	.22

*, ** Statistically significant at the .05 and .01 levels respectively.

Buyers appeared to use objective measurements of performance (or correlated characters) as partial criteria for determining the value of the individual at a sale where such information was available and featured. The conclusion that selection for a high level of performance is of economic value for purebred breeders offering cattle for sale at auction appears justified.

Weaning weights of 880 Hereford calves from 18 different ranches located in four general geographic areas were analyzed by least squared techniques. Reductions in sums of squares were statistically significant for locations either on a ranch or area basis. Also significant were sex and age of dam differences. Least squares constants for ages of dams when arithmetically converted to multiplicative factors were compared to Performance Registry International standards up to ten years of age:

Age of dam	Computed Factors		PRI
	Ranch basis	Area basis	
2	1.19	1.13	1.16
3	1.16	1.13	1.09
4	1.09	1.06	1.04
5	1.04	1.03	1.01
6	1.01	1.01	1.00
7	1.00	1.00	1.00
8	1.03	1.02	1.00
9	1.04	1.02	1.02
10	1.06	1.04	1.05
11	1.01	1.00	1.10
12	.97	.96	1.13
13	.97	.93	1.15
14, 15, 16	1.35	1.28	1.15

It is felt that the older dams in this study were rather intensely selected and that this selection accounts for at least part of the discrepancies.

Other constants were:

<u>Ranches</u>		<u>Sex</u>	
Greatest difference was 101.7 lbs.		Bulls	18.4
		Heifers	-20.6
		Steers	2.2
<u>Area</u>		<u>Gain per day</u>	
1 (Panhandle)	4.1	1.34	
2 (Taylor and Young Counties)	9.6		
3 (McGregor Area)	-3.4		
4 (A and M Area)	-10.3		

Observations of the nursing habits (frequency and duration) of Hereford and Brahman-Hereford F_1 calves both on Hereford dams revealed that the crossbreds nursed more frequently and for a longer total time per day. The crossbred calves weaned heavier and their dams gained less weight during the lactation period. Also, in a separate study involving only Herefords, it was found that male calves were more of a hardship on their dams than females. Mothering ability considered only as a function of the dam may be an erroneous assumption since it appears conclusive that the calf's genotype influences this character in its dam.

IV. FUTURE PLANS:

Cooperative gain tests with breeders will be terminated at least at the McGregor location. Efforts will be redirected toward a study of differences in efficiency of gain using very closely controlled animals with respect to age and weight. The cattle will all be fed identical quantities of a uniform ration. Preliminary tests are now established.

Another phase of the redirection will be the development of management procedures to reduce weight losses at weaning and to "push" the calves from early ages to attempt to have them at the assumed optimum market weight of 1000 lbs. in a maximum of 11 to 12 months. Selected high gaining calves, dams of the type proven to have good mothering ability and optimal management will be combine.

A third work plan initiated is to obtain more detailed observations of nursing habits of calves.

V. PUBLICATIONS DURING THE YEAR:

Carpenter, James A. 1961. The effect of genetic and environmental factors on weaning weights of Hereford calves. M. S. Thesis. A and M College of Texas, College Station, Texas.

Cartwright, T. C., C. F. Parker and J. A. Carpenter. 1961. Use of data processing equipment for keeping individual beef cattle performance records. Texas Agricultural Experiment Station Miscellaneous Publications 506.

Cartwright, T. C., D. E. Wideman and Judd Marrow. 1961. The value of ultrasonic and other objective measurements in the sale of a group of Angus bulls. Texas Agricultural Experiment Station Progress Report (in press).

Maddox, L. A. 1961. Using data processing equipment to keep beef cattle production records. Texas Agricultural Extension Service Bulletin.

PERFORMANCE OF COW HERDS. 1960 CALVES

McGregor Station

Breed of sire Breed of dam	A A	B B	H H	G G	L C	B H	H B
No. cows calving No. calves raised	14 14	16 10	81 79	19 17	5 4	11 11	13 13
Av. birth date Av. birth wt. (lbs.)	1-24-60 58	2-12-60 62	2-6-60 68	3-25-60 66	5-17-60 96	2-19-60 83	3-3-60 62
Av. weaning age Av. weaning wt.	180 395	180 349	180 371	180 414	180 448	180 407	180 429
Were calves creep fed?	No	No	No	No	No	No	No
Average daily gain from birth to weaning	1.9	1.6	1.7	1.9	2.0	1.8	2.0

TEX (5)

PERFORMANCE OF COW HERDS. 1960 CALVES

McGregor Station

Breed of sire Breed of dam	H Lx	B Lx	G H	G Lx	B Lx	B 23x	G 11x
No cows calving No. calves raised	14 13	14 13	4 4	9 8	25 18	2 2	19 19
Av. birth date Av. birth wt. (lbs.) Av. weaning age Av. weaning wt. Were calves creep fed? Average daily gain from birth to weaning	2-14-60 66 180 459 No 2.2	2-19-60 79 180 442 No 2.0	2-22-60 85 180 427 No 1.9	2-22-60 68 180 447 No 2.1	3-2-60 71 180 412 No 1.9	3-10-60 55 180 357 No 1.7	2-3-60 78 180 465 No 2.2

TEX (6)

PERFORMANCE OF COW HERDS. 1960 CALVES

McGregor Station

Breed of sire Breed of dam	G 32x	G 33x	C B	G 13x	G 42x	G R	G 51x
No. cows calving No. calves raised	5 4	1 1	7 5	8 8	2 2	9 8	6 2
Av. birth date Av. birth wt. (lbs.)	2-4-60 68	4-23-60 64	3-6-60 81	3-13-60 73	4-24-60 59	2-16-60 78	3-22-60 76
Av. weaning age Av. weaning wt.	180 388	180 465	180 465	180 464	180 396	180 416	180 447
Were calves creep fed?	No	No	No	No	No	No	No
Average daily gain from birth to weaning	1.8	2.2	2.1	2.2	1.9	1.9	2.1

TEX (7)

PERFORMANCE OF COW HERDS. 1960 CALVES

Texas Station

Location Line or group Breed of sire Breed of dam	McGregor - G 52x	McGregor - G 14x	McGregor - G 61x	McGregor - C 1x	McGregor - C 3,5 and 9x	A and M Plantation College Station ROP Control Hereford Hereford Hereford
No. cows calving	1	2	2	21	7	106
No. calves raised	1	2	2	20	7	102
Av. birth date	4-5-60	1-29-60	2-1-60	2-20-60	2-27-60	10-10-60
Av. birth wt. (lbs.)	62	94	72	74	93	-
Av. weaning age	180	180	180	180	180	-
Av. weaning wt.	422	508	481	472	456	-
Were calves creep fed?	No	No	No	No	No	No
Average daily gain from birth to weaning	2.0	2.3	2.3	2.2	2.0	-

TEX (8)

TEX (9)

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
(or pastured for high gains)

McGregor Station

Breed of sire	H	A	B	C	G
Breed of dam	H	A	B	C	G
BULLS, No.	11 ⁽¹⁾	2 ⁽¹⁾	6 ⁽¹⁾	5 ⁽¹⁾	3 ⁽¹⁾
Av. initial age (days)	266	273	282	264	278
Av. initial wt. (lbs.)	546	574	563	598	666
Av. no. days on feed	140	140	140	140	140
Av. final weight	913	914	859	964	1055
Av. daily gain	2.6	2.4	2.1	2.6	2.8
Av. score					
Condition	63	67	57	65	67
STEERS, No.	29 ⁽¹⁾				
Av. initial age (days)	261				
Av. initial wt. (lbs.)	480				
Av. no. days on feed	140				
Av. final weight	780				
Av. daily gain	2.2				
Av. score					
Condition	55				
HEIFERS, No.	28 ⁽¹⁾	3 ⁽¹⁾	5 ⁽¹⁾	3 ⁽¹⁾	3
Av. initial age (days)	259	268	230	264	300
Av. initial wt. (lbs.)	488	467	392	657	495
Av. no. days on feed	140	140	140	140	140
Av. final weight	731	668	624	932	795
Av. daily gain	1.8	1.4	1.7	2.0	2.1
Av. score					
Condition	60	59	53	59	61
HEIFERS, No.	4 ⁽²⁾	1 ⁽²⁾	5 ⁽²⁾	2 ⁽²⁾	
Av. initial age (days)	305	327	319	303	
Av. initial wt. (lbs.)	462	458	458	598	
Av. no. days on feed	140	140	140	140	
Av. final weight	734	698	687	896	
Av. daily gain	1.9	1.7	1.6	2.2	
Av. score					
Condition	59	57	44	50	

(1) Feed Lot, See notes.

(2) Grazing, See notes.

TEX (10)

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER
WEANING (or pastured for high gains)

McGregor Station

Breed of sire	L	B	H	B	B
Breed of dam	L	H	B	lx	4x
BULLS, No.	4(1)				
Av. initial age (days)	266				
Av. initial wt. (lbs.)	673				
Av. no. days on feed	140				
Av. final weight	1067				
Av. daily gain	2.8				
Av. score					
Condition	62				
STEERS, No.		7(1)	6(1)	16(1)	8(1)
Av. initial age (days)		291	321	249	273
Av. initial wt. (lbs.)		536	591	538	568
Av. final weight		862	923	832	867
Av. daily gain		2.4	2.4	2.1	2.2
Av. score					
Condition		60	62	54	60
HEIFERS, No.	1(1)	9(1)	6(1)	6(1)	5(1)
Av. initial age (days)	301	248	259	247	233
Av. initial wt. (lbs.)	720	556	580	520	465
Av. no. days on feed	140	140	140	140	140
Av. final weight	1025	817	844	740	693
Av. daily gain	2.2	1.9	1.9	1.6	1.7
Av. score					
Condition	64	65	63	56	58
HEIFERS, No.		2(2)	1(2)	1(2)	4(2)
Av. initial age (days)		280	319	318	318
Av. initial wt. (lbs.)		502	581	496	496
Av. no. days on feed		140	140	140	140
Av. final weight		823	851	773	722
Av. daily gain		2.3	1.9	2.0	1.8
Av. score					
Condition		70	57	47	47

(1) Feed Lot, See notes
(2) Grazing, See notes

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER
WEANING (or pastured for high gains)

McGregor Station

Breed of sire	H 1x	H 4x and 23x	L 3x-5x and 9x	L 1x	G H
Breed of dam					
STEERS, No.	7 ⁽¹⁾	3 ⁽¹⁾	3 ⁽¹⁾	5 ⁽¹⁾	3 ⁽¹⁾
Av. initial age (days)	245	280	259	239	269
Av. initial wt. (lbs.)	587	488	585	644	487
Av. no. days on feed	140	140	140	140	140
Av. final weight	890	816	916	951	806
Av. daily gain	2.2	2.4	2.4	2.2	2.3
Av. score	61	54	65	60	55
STEERS, No	2 ⁽²⁾				
Av. initial age (days)	305				
Av. initial wt. (lbs.)	609				
Av. no. days on feed	140				
Av. final weight	973				
Av. daily gain	2.2				
Av. score	43				
HEIFERS, No	11 ⁽¹⁾	2 ⁽¹⁾	6 ⁽¹⁾	2 ⁽¹⁾	1
Av. initial age (days)	252	309	250	242	255
Av. initial wt. (lbs.)	532	499	607	632	549
Av. no. days on feed	140	140	140	140	140
Av. final weight	776	780	886	896	800
Av. daily gain	1.8	2.0	2.0	1.9	1.8
Av. score	61	75	64	60	73
HEIFERS, No.		2 ⁽²⁾	1 ⁽²⁾		
Av. initial age (days)		302	311		
Av. initial wt. (lbs.)		457	673		
Av. no. days on feed		140	140		
Av. final weight		705	970		
Av. daily gain		1.8	2.1		
Av. score		50	60		

(1) Feed Lot, See notes.

(2) Grazing, See notes.

TEX (12)

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER
WEANING (or pastured for high gains)

McGregor Station

Breed of sire	G	G	G	G	G
Breed of dam	1x	11x	13x	R	14x
STEERS, No.	2(1)	12(1)	1(1)	1(1)	1(1)
Av. initial age (days)	237	242	226	242	250
Av. initial wt. (lbs.)	563	583	580	663	579
Av. no. days on feed	140	140	140	140	140
Av. final weight	922	941	887	984	921
Av. daily gain	2.6	2.6	2.2	2.3	2.4
Av. score	59	61	57	60	57
STEERS, No.	2(2)		2(2)	2(2)	
Av. initial age (days)	316		320	294	
Av. initial wt. (lbs.)	623		541	604	
Av. no. days on feed	140		140	140	
Av. final weight	896		859	896	
Av. daily gain	2.0		2.3	2.3	
Av. score	40		40	37	
HEIFERS, No.	1(1)	6(1)	1(1)	4(1)	1
Av. initial age (days)	226	243	281	244	260
Av. initial wt. (lbs.)	517	509	487	529	613
Av. no. days on feed	140	140	140	140	140
Av. final weight	763	748	741	772	831
Av. daily gain	1.8	1.7	1.8	1.7	1.6
Av. score	60	67	43	63	63
HEIFERS, No. (2)		1		1	
Av. initial age (days)		307		295	
Av. initial wt. (lbs.)		538		486	
Av. no. days on feed		140		140	
Av. final weight		824		755	
Av. daily gain		2.0		1.9	
Av. score		57		43	
Breed of sire	G				
Breed of dam	61x				
STEERS, No. (1)	2				
Av. initial age (days)	284				
Av. initial wt. (lbs.)	684				
Av. no. days on feed	140				
Av. final weight	1086				
Av. daily gain (lbs.)	2.9				
Av. score	70				

(1) Feed Lot, See notes.

(2) Grazing, See notes.

DATA ON ANIMALS SLAUGHTERED

McGregor Station

First Test 1959-60

Breed of sire Breed of dam	H H	B H	B Lx	L 3x	G H
Sex	Steers	Steers	Steers	Steers	Steers
No. slaughtered	3	4	6	1	1
Age at slaughter	415	412	403	390	436
Time in feedlot (days)	140	140	140	140	140
Gain in feedlot (lbs.)	266	336	266	225	252
Final feedlot weight	789	953	804	922	768
Live slaughter wt.	768	922	771	975	750
Chilled carcass wt.	442	568	474	581	455
Dressing percentage	57.60	61.58	61.47	59.59	60.67
Carcass grade	Standard	Good -	Good -	Standard	Standard +
Fat thickness over rib eye (ins.)	.39	.62	.42	.25	.34
Rib eye area (sq.in.)	7.76	9.16	8.63	10.23	8.32
W-B Shear Shear Force (lbs.)	9.69	9.37	13.63	11.19	9.06
Breed of sire ⁽¹⁾ Breed of dam	L Lx	B Lx	G 11x	H H	B H
Sex	Steers	Steers	Steers	Steers	Steers
No. slaughtered	2	2	4	7	2
Age at slaughter	398	417	400	493	482
Time in feedlot (days)	140	140	140	140	140
Gain feedlot (lbs.)	252	294	364	300	326
Final feedlot weight	920	815	919	832	862
Live slaughter wt.	880	790	894	826	854
Chilled carcass wt.	536	460	529	491	533
Dressing percentage	60.93	58.29	59.18	59.47	62.38
Carcass grade	Good +	Good -	Good -	Good -	Standard
Fat thickness over rib eye (ins.)	.44	.48	.48	.54	.48
Rib eye area (sq.in.)	8.62	8.38	9.08	7.84	9.10
W-B Shear Shear Force (lbs.)	14.19	14.03	10.37	11.44	13.75

⁽¹⁾L-B-G first test 1959-60; H-B second test 1959-60.

DATA ON ANIMALS SLAUGHTERED

McGregor Station

Second Test 1959-60

Breed of sire Breed of dam	L 3x	G H	B 4x	G 11x
Sex	Steers	Steers	Steers	Steers
No. slaughtered	1	1	2	4
Age at slaughter	464	464	484	506
Time in feedlot (days)	140	140	140	140
Gain feedlot (lbs.)	367	385	320	-
Final feedlot weight	838	866	857	-
Live slaughter weight	845	912	870	958
Chilled carcass weight	514	562	530	586
Dressing percentage	60.83	61.62	60.86	61.07
Carcass grade	Std. +	Good -	Std.	Std. +
Fat thickness over rib eye (ins.)	.50	.32	.37	.43
Rib eye area (sq.in.)	7.72	9.80	8.80	9.07
W-B Shear Shear Force (lbs.)	9.62	21.25	11.38	15.21

Notes:

Postweaning Performance of Calves - Feed Lot Cattle:

The following ration, salt and bonemeal, fed free choice.

50% Groung Hay

30% Ground Milo

10% Ground Oats

10% C/S/Meal

Plus 4 oz. of Vitamin "A" concentrate per ton of feed.

Grazing Cattle:

Grazed on oat pasture with salt and bone meal free choice.

Breed or Cross Codes:

<u>Breed Code</u>	<u>Breed</u>
A	Angus
B	Brahman
C	Charbray
G	Santa Gertrudis
H	Hereford
L	Charolais
R	Red Poll

<u>Cross Code</u>	<u>Dam Breed</u>	<u>Sire Breed</u>
1x	H	B
3x	1x	H
4x	1x	B
5x	3x	H
	9x	H
9x	B	1x
11x	H	G
13x	1x	G
14x	1x	R
23x	4x	B
32x	11x	G
33x	32x	G
42x	13x	G
51x	R	G
52x	51x	G
61x	14x	G

Texas Station

by

H. O. Kunkel

I. PROJECT: 714 (S-10)

Methods for Measuring Potential Rate of Gain and Efficiency of Feed Utilization in Immature Beef Cattle.

II. OBJECTIVES:

- A. To develop methods of a biochemical or physiological nature which will measure the potential rate of gain in immature beef animals.
- B. To develop methods of measurement of potential efficiency of utilization of feed for building body tissue.

III. ACCOMPLISHMENTS DURING THE YEAR:

The project has been revised and approved under the title "Biochemical and Fundamental Physiological Changes Occurring with Genetically Variable Growth of Animals." An extensive review of the physiological bases of genetically variable growth has been prepared.

Principal efforts have been made to elucidate the relationship of ruminal development to rates of gain. Using wether lambs as experimental animals, attempts were made to alter growth or papillary development or both by stress treatments. The present data indicate that susceptibility to insulin shock is correlated to development of the rumen, providing a possible lead to a means of evaluating ruminal development in the intact animal.

Mathematical or theoretical models have been derived from the growth equations of Brody and von Bertalanffy. These equations have received preliminary statistical test with the levels of serum proteins and serum protein-bound iodine being independent variables. Based on the new theoretical models, re-evaluation of data accumulated during the past seven years is now under way.

IV. FUTURE PLANS:

Principal attention will be directed toward development of theoretical and mathematical models for the study of the physiological bases of variable growth. Accumulated data will be reanalyzed in accordance with these models. Papillary development and retrogression in cattle and sheep will receive continued study. An analytical study of bovine serum proteins will be initiated.

V. PUBLICATIONS:

Kunkel, H. O., J. C. Reager and H. A. Glimp. 1960. Retrogression of the ruminal mucosa of weanling lambs. Abstracts, V Int. Cong. Nutrition, p. 8.

Kunkel, H. O. 1961. Biochemical and fundamental physiological bases of genetically variable growth of animals (a review). Texas Agr. Expt. Sta. Misc. Pub. (in press).

Texas Station

by

H. O. Kunkel

I. PROJECT: 959 (S-10)

Biochemical and Physiological Anomalies of Bovine Dwarfism and Their Use in Detection of Heterozygotes.

II. OBJECTIVES:

- A. The detection of biochemical or physiological anomalies which may be associated with bovine dwarfism of various types, with an attempt to identify the metabolic defects which cause dwarfism.
- B. The determination of the usefulness of biochemical or physiological anomalies, which may be detected in dwarfs, in the detection of heterozygotic phenotypically normal animals.

III. ACCOMPLISHMENTS DURING THE YEAR:

A continued effort was made to study the reactions of the pentose cycle in erythrocytes of dwarf and normal animals. A natural inhibitor of the glucose-6-phosphate (G-6-P) and 6-phospho gluconate (6PG) dehydrogenases was found to be associated with the red cell stroma. The data indicate that this inhibitor is enzymic resulting in the destruction of the necessary cofactor, triphosphopyridine nucleotide (TPN), and is overcome with higher levels of TPN added to the system.

The effect of age on the activity of the G-6-P and 6-PG dehydrogenases stromatic inhibitors was evaluated. The data from this study indicates comparable activity of the enzymes in all age groups.

A study was initiated to evaluate the effect of certain stresses on the free amino acid concentrations in the plasmas of dwarf and normal animals. Both dwarf and normal animals were fasted 96 hrs. and blood samples taken at 24 hour intervals. A protein free filtrate was obtained and the analysis is presently being accomplished using the Moore and Stein ion-exchange procedure.

IV. FUTURE PLANS:

A continued effort will be made to further evaluate comparatively the reactions of the pentose cycle and their implications with respect to dwarfism. The present study on the plasma free amino acid levels will be completed and evaluated. An attempt to accurately measure the micopolysaccharides accumulations in the serum of dwarf and normal animals.

Virginia Station

by

J. A. Gaines

I. PROJECT: Hatch 93901 (S-10) (AHRD dl-7)

Heterosis from crosses among British breeds of beef cattle.

II. OBJECTIVES:

- A. To measure heterosis obtained from crosses among Angus, Hereford and Shorthorn beef cattle as shown by growth rate, fattening ability, and carcass quality up to approximately two years of age.
- B. To measure productive ability of dams.

III. PERSONNEL:

J. A. Gaines, W. H. McClure, R. C. Carter, J. S. Copenhaver, G. W. Litton and C. M. Kincaid.

IV. ACCOMPLISHMENTS:

- 1. Scope and nature of work: In scope this project involves approximately 250 beef cattle each year, 600 acres of Virginia Agricultural Experiment Station land, and 200 acres of leased pasture. The nature of the work is basic beef cattle Genetics, but it is anticipated that the results may influence methods of market cattle production.
- 2. Research results: Please see summary sheet enclosed.

V. FUTURE PLANS:

- A. Heifers from fourth calf crop will be slaughtered 11 May 1961.
- B. Steers from fourth calf crop will be slaughtered January, 1962.
- C. Fifth calf crop will be weaned in November, 1961.
- D. Cows will be bred and sold. A new herd of straight-bred and crossbred cows will be introduced into the project in order to begin Phase 2. The new cows will not be bred until May, 1962.

VI. PUBLICATIONS: None

VII. PUBLICATIONS PLANNED:

An article in the Journal of Animal Science giving estimates of genetic parameters concerned with feed efficiency in full fed cattle.

Table 1. Three-year summary based on 139 steers

	Pure- bred	2-br. cross	3-br. cross	back- cross	Total or mean
Number weaned	32	36	34	37	139
Birth weight	67	68	67	67	67
Weaning weight	388	398	422	401	402
Feeder grade at weaning	11.0	10.8	10.6	10.8	10.8
A.D.G. birth to weaning	1.54	1.58	1.58	1.54	1.56
A.D.G. weaning to full feed	1.11	1.21	1.20	1.11	1.16
A.D.G. on full feed	2.19	2.21	2.18	2.18	2.19
Slaughter weight	1055	1106	1121	1069	1088
Slaughter grade	11.1	11.3	11.2	11.1	11.2
Carcass grade	10.9	11.1	11.1	11.1	11.1
Carcass weight	630	662	676	642	652
Dressing percent	59.8	59.9	60.2	60.0	60.0
Loin eye area	10.4	11.3	11.4	10.8	11.0

Table 2. Three-year summary based on 148 heifers

	Pure- bred	2-br. cross	3-br. cross	back- cross	Total or mean
Number weaned	36	37	35	40	148
Birth weight	65	67	64	66	66
Weaning weight	357	366	397	369	375
Feeder grade at weaning	10.8	10.6	11.0	10.0	10.6
A.D.G. birth to weaning	1.43	1.47	1.51	1.48	1.47
A.D.G. on full feed	1.76	1.79	1.82	1.87	1.81
Slaughter weight	743	760	802	784	770
Slaughter grade	11.7	12.2	12.8	12.3	12.3
Carcass grade	11.7	12.3	12.1	11.9	12.0
Carcass weight	437	451	476	464	456
Dressing percent	58.8	59.2	59.4	59.1	59.2
Loin eye area	8.5	8.8	9.4	9.3	9.0

Table 3. Calving percentages based on four calf crops

	Pure- bred	2-br. cross	3-br. cross	back- cross	Total or mean
Number of matings	112	120	115	117	464
Number of calves weaned	85	102	95	105	387
Percent weaned	76	85	83	90	83

PERFORMANCE OF COW HERDS: 1960 CALVES. Project 93901

Fourth calf crop Virginia Station

Location Line or group ⁽¹⁾ Breed of sire ⁽¹⁾ Breed of dam	Purebred	2-breed cross	Steeles Tavern, 3-breed cross	Virginia backcross
No. cows calving	21	29	27	29
No. calves raised	19	29	26	28
Av. inbr. of dams (%)	0	0	0	0
Av. inbr. of calves (%)	0	0	0	0
Av. birth date	28 March	31 March	14 March	15 March
Av. birth wt. (lbs.)	69	73	73	69
Av. weaning age	201	198	215	214
Av. weaning wt.	413	426	439	426
Av. weaning type score	12.6	11.6	11.3	11.7
Were calves creep fed?	No	No	No	No
Average daily gain from birth to weaning	1.73	1.78	1.71	1.70

(1) Purebreds were Angus (A), Hereford(H), and Shorthorn(S). First crosses were A X H, H X A, A X S, S X A, H X S and S X H. Three breed crosses were HS X A, AS X H and AH X S. Backcrosses were AH X A, AS X A, AH X A, HS X A, AS X S and HS X S. AH, AS and HS were crossbred (F₁) bulls.

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
 Third Calf Crop Virginia Station
 Project 93901

Location Line or group	Steeles Tavern, Va.			
	Purebred	2-breed cross	3-breed cross	Backcross
Breed of sire ⁽¹⁾				
Breed of dam ⁽¹⁾				
STEERS, No.	9	11	14	14
Av. initial age (days)	547	548	565	556
Av. initial wt. (lbs.)	809	834	863	807
Av. no. days on feed	120	120	120	120
Av. final weight	1100	1122	1141	1094
Av. daily gain	2.42	2.40	2.31	2.38
Av. score				
Conformation	12.1	11.5	11.4	11.2
HEIFERS, No.	16	14	8	16
Av. initial age (days)	208	207	224	205
Av. initial wt. (lbs.)	410	416	478	425
Av. no. days on feed	235	235	235	235
Av. final weight	803	810	895	844
Av. daily gain	1.83	1.83	1.92	1.93
Av. score				
Conformation	12.1	12.2	13.2	12.6

(1) See footnote on Performance of Cow Herds.

Project 93901. DATA ON ANIMALS SLAUGHTERED; Third Calf Crop

Virginia Station

Location	Pure-bred	2-breed cross	3-breed cross	Steeles Tavern back-cross	Va. Pure-bred	2-breed cross	3-breed cross	back-cross
Herd	steers	steers	steers	steers	heifers	heifers	heifers	heifers
Breed of sire ⁽¹⁾								
Breed of dam ⁽¹⁾								
Sex								
No. slaughtered	9	11	14	14	16	14	8	16
Age at slaughter	667	668	685	676	443	442	459	440
Time in feedlot (days)	120	120	120	120	235	235	235	235
Gain in feedlot (lbs.)	293	288	278	287	393	394	417	419
Final feedlot weight	1100	1122	1141	1094	803	810	895	844
Slaughter weight ⁽²⁾	1100	1122	1141	1094	803	810	895	844
Carcass weight ⁽³⁾	661	673	687	655	481	494	545	508
Dressing percentage ⁽⁴⁾	60.0	60.0	60.2	59.9	60.0	61.0	60.8	60.2
Slaughter grade	12.1	11.5	11.4	11.2	12.1	12.2	13.2	12.6
Carcass grade	11.2	11.0	11.2	10.7	11.9	12.6	11.9	11.9
Rib eye area (sq.in.)	11.1	11.6	11.4	11.2	8.5	9.7	9.6	9.6
Fat thickness over rib eye (ins.)	-	-	-	-	1.18	1.12	1.12	1.08

(1) See footnote on Performance of Cow Herds.

(2) No time lapse.

(3) Hot.

(4) Final feedlot weight at the farm and hot carcass weight.

I. PROJECT: S-92186 (S-10) (AHRD dl-35)

A study of dwarfism in beef cattle

II. OBJECTIVES:

A. To determine the pathogenesis of dwarfism in beef cattle by finding:

1. The morphological site of gene expression.
2. The period during which gene expression operates.
3. The mode of action of the responsible gene.

B. Attempt to devise a method by which the dwarf carrier animal may be recognized at a young age.

III. ACCOMPLISHMENTS DURING THE YEAR:

More than 700 histological section were prepared from fetus of known genotypes (homozygous normal - NN, heterozygotes Nn, and homozygous dwarf - nn) and studied under magnification in an effort to determine the morphological site of gene expression, period of abnormal development and the modus operandi. Fetuses studied included NN fetuses at 59, 70, 98, 111 and 146; Nn at 58, 71, 98, 131 and 148 days; and nn at 37, 70 and 145 days. No histological abnormalities were observed. Blood samples were taken of the cows and of all fetuses from which blood could be obtained and analyzed for inorganic phosphate, PBI and glucose. There were no significant differences between the genotypes. Total values were higher for inorganic phosphate and glucose but lower for PBI than the dams.

Urine samples were obtained from 13 dwarf, 1 known carrier, 1 clean pedigree and 7 normal appearing, heifers (carrier status unknown) and analyzed for urionic acid in non-dialyzable protein precipitable mucopolysaccharide by A. J. Bollet, M.D., Department of Preventive Medicine, University of Virginia School of Medicine. No significant differences between the genotypes were found.

A survey on reproductive performance of 13,139 cows in herd participating in Virginia BCIA program over a six year period from 1954 through 1959 showed the following: Among the Angus 3.24% of all calves were born dead, .35% were dwarfs, and 95% of the calves born were weaned for a calf crop of 89.8%. Among the Herefords 2.98% were dead at birth, 1.41% were dwarfs, and 95% of the calves born were weaned for an 87.1% calf crop. Percentage of dwarfs in the Herefords reach a peak in 1956 of nearly 3% but has since decreased to about .5%. In the Angus herds the number of dwarfs have increase from about .2% in 1954-55 to about .6% in 1959 and have probably not reached their peak yet. (See tables 1 and 2)

In 52 of the these herds each bull was classified in regard to dwarfism as: (1) known carrier, (2) had known carrier parent or grandparent, (3) otherwise questionable pedigree, (4) clean breeding record and pedigree, (5) and unknown. Of the 340 herd bulls classified, approximately 12% of the Angus and 22% of the Herefords were known carriers. Classifications 2, 3 and 4 were

approximately the same for both breeds (7, 18 and 36 percent, respectively). We were unable to classify about 17% of the Herefords and 27% of the Angus bulls. Among the 2517 cows classified in 30 herds the percentage of known carriers was much smaller (only about 1% of the Angus and 5% of the Herefords). Again classifications 2 and 3 were approximately the same for the two breeds, or 13 and 50 percent, respectively. Forty-seven percent of the Angus were classified clean and 16% unknown, whereas 53% of the Hereford cows were classified clean and only 10% as unknown. (See table 3 and 4)

Weights, grades and other data were obtained on all cows. Weights and grades were adjusted to a mature equivalent in average flesh condition, nursing a calf and weighed and graded during July through September, sorted by dwarfism status and their weights and grades compared. The preweaning growth rate and type score of their calves were also compared. Among the Angus, 51 known carrier cows averaged 75 pounds lighter and graded 1/3 grade below 314 clean cows. Their calves also grew .35 pound per day slower than calves from the clean cows. Among the Herefords, 29 known carrier cows averaged 94 pounds lighter but graded the same as 121 clean cows. There was a difference of .13 pound daily gain in growth rate of calves in favor of the clean cows.

IV. FUTUTE PLANS:

The active project will be closed out June 30, 1961. Remainder of the data will be analyzed and prepared for publication.

V. PUBLICATIONS DURING THE YEAR:

Marlowe, T. J. 1960. A comparison of the growth hormone content of the pituitary glands from dwarf and normal beef calves. J. Animal Sci. 19: 810-819.

VI. PUBLICATIONS PLANNED:

An Experiment Station bulletin covering all of the research completed on this project.

Table 1. REPRODUCTIVE PERFORMANCE IN ANGUS COWS.

Year	Number of Herds	Number of Cows	Number of Calves				Percentage of Calves Born			% Calf Crop
			Calves Born	Calves Born Dead	Dwarf Calves	Calves Weaned	Calves Born Dead	Dwarf Calves	Calves Weaned	
1954	9	374	344	14	1	329	4.07	0.29	95.6	87.9
1955	15	678	633	21	1	602	3.32	0.15	95.0	88.8
1956	21	1082	1041	32	2	992	3.07	0.19	95.3	91.7
1957	22	1223	1167	28	5	1107	2.40	0.43	94.9	90.5
1958	26	1430	1356	34	3	1297	2.51	0.22	95.6	90.7
1959	24	1481	1403	57	9	1321	4.07	0.64	94.2	89.2
Total or Average	107	6268	5944	186	21	5648	3.24	0.35	95.0	89.8

VA (8)

Table 2. REPRODUCTIVE PERFORMANCE IN HEREFORD CATTLE

Year	Number of Herds	Number of Cows	Number of Calves				Percentage of Calves Born			% Calf Crop
			Calves Born	Calves Born Dead	Dwarf Calves	Calves Weaned	Calves Born Dead	Dwarf Calves	Calves Weaned	
1945	14	887	827	25	19	773	3.02	2.30	93.5	87.1
1955	16	1062	955	30	11	918	3.14	1.15	9.61	86.4
1956	18	1167	1110	27	31	1038	2.43	2.79	93.5	88.9
1957	18	1152	1074	27	13	1029	2.51	1.21	95.8	89.3
1958	21	1256	1142	37	5	1090	3.24	0.44	95.4	86.8
1959	21	1347	1183	42	7	1134	3.55	0.59	95.9	84.2
Total or Average	108	6871	6291	188	86	5982	2.98	1.41	95.0	87.1

Table 3. SIRE CLASSIFICATION IN REGARD TO DWARFISM, 1954-59

Breed	Number Herds	Known Carriers	Sons or Grandsons of Known Carriers	Questionable Pedigree	Clean Pedigree	Unknown	Total
Angus							
Number	28	21	14	33	64	48	180
Per Cent		11.67	7.78	18.33	35.56	26.67	100
Hereford							
Number	24	36	9	28	59	28	160
Per Cent		22.50	5.63	17.50	36.88	17.50	100

VA (9)

Table 4. COW CLASSIFICATION IN REGARD TO DWARFISM, 1954-59

Breed	Number Herds	Known Carriers	Daughters or Granddaughters of Known Carriers	Questionable Pedigree	Clean Pedigree	Unknown	Total
Angus							
Number	14	9	153	246	528	184	1120
Per Cent		0.80	13.66	21.96	47.15	16.43	100
Hereford							
Number	16	73	182	269	739	134	1397
Per Cent		5.23	13.03	19.26	52.90	9.60	100

Virginia Station

by

Thomas J. Marlowe

I. PROJECT: S-031-8 (S-10)

Evaluation of the Effectiveness of Selection for Economic Traits in Beef Cattle.

II. OBJECTIVES:

- A. To obtain estimates of genetic parameters from field data to include:
 - 1. Heritability and repeatability of traits.
 - 2. Phenotypic and genetic correlations.
 - 3. Proper weighting of traits in a selection index.
- B. To study the effects of location on performance records.
- C. To re-evaluate (and possibly indentify others) the constants now being used in the Virginia BCIA program in correcting for non-genetic differences.
- D. To study the relationship of mature weight of herd sires and dams to the performance of their offspring.
- E. To determine the minimum postweaning gains required to obtain measurable genetic differences among animals.
- F. To study the relationship among live animal measurements, type ratings, and growth rates.
- G. To evaluate the effectiveness of selection on the improvement of beef cattle under farm conditions.

III. ACCOMPLISHMENTS DURING THE YEAR:

- A. This project was started in 1959. The source and procedures for processing the data were described in the 1959 annual report. Only the progress on Objective D will be reported here since most of the accomplishments during the year are related to that objective. In order to accomplish the objective, it was necessary to study the factors that influence weight and grade of beef cattle so that all animals (either bulls or cows) could be adjusted to a common base for comparisons.

A study to determine the factors that influence weight and grade of beef bulls, reported in 1959, combined the Angus and Hereford breeds on the assumption that the same factors influence both breeds alike. Since that time it has been found that that assumption was in error. Consequently, a new study was made on a within-breed basis which included 1500 bulls of the four major beef breeds in Virginia, namely Angus, Horned Herefords, Polled Herefords and Shorthorns. Polled and Horned Shorthorns were combined because of the relatively small number of observations. A comparable study of the weights and grades of 993 Angus and 835 Hereford cows was also accomplished. Findings from both studies follow.

Influence of Age, Breed, Flesh Condition
and Season on Weight and Grade of Beef Bulls

by

T. J. Marlowe, R. J. Freund and J. B. Graham.

These data were used to compute least squares estimates of the effects of age, flesh condition and season on the weight and grade of four major breeds of beef bulls. Weights, grades and condition scores were obtained on 1500 bulls ranging in age from one through eleven years for this study. About half of them were in more than 200 herds in Virginia and the other half obtained at several sale locations just prior to the sale. The relative influence of these factors on weight and grade varied rather widely among the four breeds and two age groups studies.

In the age group of 12 through 24 months, these factors accounted for 70.7, 69.2, 76.7 and 80.1 per cent of the total variation in weight and 43.7, 29.7, 37.3 and 56.2 per cent of the variation in grade for Angus, Horned Hereford, Polled Hereford and Shorthorn bulls, respectively. The total influence of these factors was considerably less among the older bulls (2-11 years), accounting for 47.6, 47.7, 35.0 and 53.6 per cent of the total variation in weight and 17.1, 48.8, 33.1 and 46.0 per cent of the total variation in grade for Angus, Horned Hereford, Polled Hereford, and Shorthorn bulls, respectively.

Influence on Weight

As one might expect, the factor contributing the greatest influence on weight was age, accounting for 28.3 to 42.3 per cent among the younger bulls and from 12.8 to 32.7 per cent among the older bulls depending on the breed in question.

The second largest influence on weight was flesh condition, accounting for 11.7 to 32.3 per cent of the total variation among the younger bulls and from 17.2 to 24.5 per cent among the older bulls.

Season had a much smaller effect on weight, accounting for only 0.5 to 4.7 per cent of the total variation among the younger bulls and from 1.5 to 6.4 per cent among the older bulls.

Angus bulls were lighter than the other breeds at all ages. At maturity, they were approximately 100 pounds lighter than the Polled Herefords and 150 pounds lighter than the Horned Herefords and Shorthorns. There was practically no difference in weight between Polled and Horned Herefords from 12 to 48 months of age; however, Horned Herefords appeared to be slightly heavier at maturity. Shorthorns were intermediate in weight between Angus and Hereford up to about 30 months and were the same as Horned Herefords thereafter.

Influence on Grade

Age had only a minor influence on grade ranging from 2.0 to 5.9 per cent among the Angus and Hereford breeds. It was of greater importance in the Shorthorn breed, accounting for 10.6 and 12.1 per cent of the total variation among the younger and older groups, respectively.

All breeds had about the same average grade at each stage of growth from 12 months to maturity except the Horned Shorthorns which graded about $1/3$ of a grade higher at all ages. The higher grade of the Horned Shorthorns can probably be explained by the fact that most of them were fitted bulls for sale at the American Shorthorn Sale at Winchester, Virginia during February 1960 and 1961.

Flesh condition of the bulls had the largest single influence on grade of all the factors studied. Again a breed difference was apparent. Among the polled breeds (Angus and Polled Hereford), flesh condition was much more important in the younger age group, whereas among the horned breeds (Hereford and Shorthorn), it had about equal influence in both age groups.

The effect of season was of only minor importance except for the older Hereford bulls. Among the Angus, it accounted for only 2.9 and 1.9 per cent of the total variation among the younger and older age groups, respectively. Corresponding values for the Horned Herefords were 5.0 and 14.6 and for the Polled Herefords 10.3 and 17.7, respectively. No estimate of season effect was obtained for the younger Shorthorn bulls since nearly all of them were weighed and graded during February. Season accounted for 5.5 per cent of the variation in grade among the older Shorthorn bulls.

Influence of Polled Condition in Shorthorns

There was no significant difference in weight between polled and horned Shorthorn bulls in either age group. However, there was a highly significant difference in grade among the younger bulls amounting to approximately $2/3$ of a grade (2 grade points) in favor of the horned bulls.

Adjusted Weights and Grades.

Adjusted weights and grades for bulls of the four breeds at different ages are shown in tables 1a and 2a.

Table 1a. Adjusted Weights of Beef Bulls of Four Major Breeds at Various Ages

Age in Months	Breed			
	Angus	P. Hereford	H. Hereford	Shorthorn
12	706	817	820	767
18	960	1098	1085	1000
24	1100	1240	1255	1213
30	1210	1220	1142	1306
36	1250	1344	1386	1356
42	1292	1400	1415	1416
48	1300	1452	1479	1475
54	1365	1475	1539	1539
Mature	1395	1492	1550	1550

All weight adjusted to an average flesh condition (pasture breeding condition) and weighed during July through September (except the 12-24 month old Shorthorns which were all weighed in February).

Table 2a. Adjusted Grades of Beef Bulls of Four Major Breeds at Various Ages.

Age in Months	Breed			
	Angus	P. Hereford	H. Hereford	Shorthorn
12	12.92	12.74	12.99	14.01
18	13.70	12.73	13.18	14.35
24	13.30	12.47	13.89	13.72
30	13.41	13.81	13.96	14.64
36	13.40	13.26	13.83	13.63
42	13.35	14.01	13.32	14.00
48	12.87	12.90	13.08	13.29
54	13.45	13.50	13.68	14.00
Mature	13.53	14.08	13.99	15.63

All grades adjusted to an average flesh condition (pasture breeding condition) and graded during July through September (except the 12-24 month old Shorthorns which were all graded in February).

Influence of Age, Breed, Flesh Condition, Nursing and Season on Weight and Grade of Beef Cows

by

Thomas J. Marlowe and Joseph B. Graham

Data for this study were obtained by weighing, grading and recording flesh condition, whether nursing calf, dry, heavy with calf or not calved, and season of year on 993 Angus and 835 Hereford cows ranging in age from 16 months to 18 years. 519 of the Angus and 400 of the Herefords were over 6 years of age. Cows were in 12 Angus and 13 Hereford herds. They included both commercial and purebred cattle but were mostly purebreds.

Least squares estimates were obtained of the effects of age, flesh condition, lactation status and season on weight and grade of Angus and Hereford breeding cows. Breed differences were apparent; therefore, all estimates were on a within-breed basis. The factors studied accounted for 61.88% and 67.92% of the total variation in weight and 32.40% and 29.00% of the total variation in grade of the Angus and Hereford cows, respectively.

Influence on Weight

Age has the greatest influence on weight among the younger cows, whereas the primary influence among the older cows was flesh condition. Angus cows had attained a higher percentage of their final mature weight by 18 and 24 months than Hereford cows; however, Hereford cows were heavier than Angus at all ages studied except 18 months. Perhaps the samples at that age were not truly representative of the two breeds. The fact that Angus cows were no heavier at 30 months than at 18 months indicates that a less than perfect job was done in the scoring for differences in flesh condition. Nursing and/or season of year had practically no influence on weight when adjusted for differences in flesh condition. Their primary influence was on flesh condition and when it was ignored, they accounted for a fairly large fraction of the variance. Dry Angus cows weighed only 28 pounds more and Hereford cows actually weighed 18 pounds less than cows suckling calves. This can be explained by the fact that most of the dry cows had weaned their calves shortly before they were weighed. Very thin cows weighed 136 and 213 pounds less and fat cows 218 and 181 pounds more than Angus and Hereford cows in average flesh condition, respectively. Angus cows were heaviest during July through October, whereas Hereford cows were heaviest during January through March. Even though varying in magnitude, all factors studied had a significant influence on weight.

Influence on Grade

Age had very little influence on grade, accounting for only 1.68% and 2.13% of the variance among the Angus and Herefords, respectively. However, there was a slight increase in grade with age among the Hereford cows amounting to less than one grade point ($1/3$ of a full grade) over the entire age range. The reverse was true among the Angus where the grade decreased slightly as the cows approached maturity. There was essentially no difference in average grade between the two breeds. The largest influence on grade was flesh

condition, which accounted for 22.46% of the variation among the Angus and 19.87% among the Herefords. Very thin cows graded 1.2 and 1.6 grade points below cows in average flesh condition of the Angus and Hereford breeds, respectively. On the other hand, fat cows of the same two breeds graded 1.7 and 1.2 grade points higher than average flesh condition cows.

Adjusted Weights and Grades

Table 1b shows the weights and grades of Angus and Hereford cows at various ages after adjustments were made for differences in flesh condition, season of year when weighed and graded and whether they had not yet calved, nursing, heavy with calf, or dry.

Table 1b. Adjusted Weights and Grades of Angus and Hereford Cows at Various Ages.

Age in Months	Angus			Hereford		
	No. Head	Adj. Wt.	Adj. Grade	No. Head	Adj. Wt.	Adj. Grade
18	18	790	11.27	115	632	11.37
24	15	837	10.37	1	872	11.41
30	108	789	11.19	18	980	11.56
36	41	863	11.10	30	1035	11.65
42	92	903	11.35	84	1047	12.27
48	28	944	11.49	31	1040	12.00
60	92	945	11.31	92	1051	12.05
72	80	985	11.71	64	1077	12.24
Mature	519	1013	11.62	400	1113	12.24

Weights and grades adjusted to mature cows (over 6 yrs.) in average flesh condition, nursing a calf and weighed and graded during July-October.

IV. FUTURE PLANS:

This project will be continued in accordance with the objectives listed above until they have been accomplished.

V. PUBLICATIONS DURING THE YEAR:

None

VI. PUBLICATIONS PLANNED:

Plan to submit two papers to the Journal of Animal Science during 1961. One on the factors that influence the weight and grade of beef cattle and another on the relationship of mature weight and grade to the performance of the offspring.

Supplement to S-031-8

Some Factors That Influence the Sale Price of
Purebred Hereford Calves in Southwest Virginia

by

Thomas J. Marlowe and Edwin B. Wilson

Factors included in this study were year and location of sale, dwarfism status of each animal's pedigree, grade or type score, average daily gain from birth to sale date, and age and weight of each animal at time of sale. Data for the study consisted of records on 201 purebred Hereford bull calves and yearling bulls and 418 purebred heifer calves at three sale locations covering a total of five years as follows: 122 bulls and 232 heifers sold at Bland from 1955 through 1959, 42 bulls and 117 heifers sold at Wytheville from 1957 through 1959, and 37 bulls and 69 heifers sold at Tazewell during 1958 and 1959.

Least squares estimates of the effects studied are shown in Table 1. These effects accounted for 75.65 per cent of the total variation in sale price of the bulls and 66.29 per cent among the heifers. The high year was 1958 which averaged \$121, \$120, \$85 and \$56 above 1955, 1956, 1957 and 1959 sale price for the bulls and \$63, \$95, \$54 and \$24 for the heifers, respectively. Tazewell sales averaged \$46.47 and \$36.71 higher for the bulls and heifers, respectively, than the Bland sales and \$60.41 and \$61.86 above the Wytheville sales. Sale price increased by \$17.10 for each 1/3 of a grade, on the average, among the bulls from low good (9) to top choice (14) with no additional increase for the fancy grade (15). The average increase among the heifers was \$12.57 for each 1/3 of a grade increase in conformation. Medium grade heifer calves sold for \$15.60 below good grade calves, and choice calves brought \$14.75 per head more than top good grade heifer calves. Fancy heifer calves brought the top price, averaging \$63.45 above the top good grade heifer calves.

Average daily gain from birth to sale date was an important factor in the sale price of bulls (\$69.35 per pound) but had no significant influence on the sale price of heifers. When index value (which is a combination of grade and ADG) was considered in place of grade and ADG, buyers paid \$2.55 per index point for the bulls and \$1.36 per index point for the heifers. They also paid 33 cents per day of age to obtain the older bulls but paid no attention to the age of the heifers. Size (weight) influenced sale price of heifers more than bulls when ADG was considered at the same time. Apparently they placed more emphasis on average daily gain than on final weight in purchasing bulls; whereas, the reverse was true with heifers. When ADG was eliminated in the analysis, weight became an important factor, amounting to \$40.16 per hundred weight of bulls and \$28.54 for heifers.

Buyers discriminated against pedigrees with known "carrier" or questionable animals in regard to dwarfism by paying \$58.46 more for bulls and \$47.12 more for heifers with clean pedigrees.

Table 1. Least Squares Estimates of the Effects of Various Factors on the Sale Price of Purebred Hereford Calves in Southwest Virginia During 1955-59

Classification of Effects Studied		Bulls			Heifers		
		No. Head	b Value	Std. Dev.	No. Head	b Value	Std. Dev.
Year	1955	15	-120.71	16.54**	40	-63.32	7.56**
	1956	21	-120.29	15.25**	53	-95.33	7.04**
	1957	44	- 84.71	11.81**	92	-54.10	5.50**
	1958	61	Base	--	127	Base	--
	1959	60	- 56.01	10.40**	106	-24.05	5.07**
Location	Bland	122	Base	--	232	Base	--
	Wytheville	42	- 13.94	10.66	117	-25.11	4.63**
	Tazewell	37	46.47	11.91**	69	36.71	5.83**
Type Score	7 Medium)	3	1.99	32.09	6	-24.75	15.45**
	8 +)						
	9 -	9	- 19.82	19.71	20	- 8.18	9.02
	10 Good	14	- 14.57	16.29	51	-10.15	6.23
	11 +	53	Base	--	99	Base	--
	12 -	56	15.38	10.57	118	4.64	4.93
	13 Choice	37	45.60	12.02**	82	24.36	5.69**
	14 +	21	64.80	14.76**	32	42.72	7.67**
	12 Low Fancy	8	51.44	20.86**	10	63.45	12.10**
Dwarf Status	Known Carrier)	106	- 54.00	9.65**	271	-50.10	4.76**
	in pedigree)						
	Questionable)	32	- 62.91	11.98**	52	-43.94	6.23**
	Clean Pedigree	63	Base	--	95	Base	--
ADG	Per Pound of ADG	201	69.35	26.95**	418	0.77	12.92
Age	Per Day of Age	201	.33	.16*	418	0.06	.09
Weight	Per 100 lb. Increase	201	13.31	.09**	418	21.13	.06**

* Significant at .05 level

** Significant at .01 level

Northern Virginia Pasture Research Station

Middleburg, Virginia

by

T. J. Marlowe and R. C. Hammes, Jr.

The Northern Virginia Pasture Research Station maintains a herd of approximately 60 purebred Angus cows and 4 herd sires. The cows are bred to calve during the summer in order that they may be weaned in March, and the entire calf crop used for grazing tests on the station. Of the 62 cows bred during the fall of 1959, 61 produced 62 calves (twins) and 56 were raised to weaning. Their average birth date was July 21, 1960. Average birth weight was 69 pounds. Their performance record is shown in the table 1 below. Calves were not creep fed.

Table 1. Preweaning Performance of 1960 Calves by Sire

Sire No.	No. of Offspring	Age in Days	Weaning Weight	ADG	Adjusted ADG	Type Score	Index Value
208	12	246	498	1.74	2.03	11.3	119
384	12	251	449	1.55	1.83	11.8	114
405*	13	244	453	1.61	1.89	11.7	116
R71	4	261	610	2.04	2.20	12.0	130
WA22	14	253	478	1.66	1.83	11.4	112
Total	55	249	480	1.67	1.91	11.6	116

* Sire 405 is a son of WA22 and sire of 208.

Beef Cattle Research Station
Front Royal, Virginia

by

B. M. Priode and K. P. Bovard

I. PROJECT:

The improvement of Beef Cattle for Virginia Through Breeding Methods
AH 150.16 (S-10) Coop. ARS.

II. OBJECTIVES:

Beef cattle research projects are conducted with three breeds of cattle (Angus, Hereford, and Shorthorn) and are associated with problems relating to the improvement of beef cattle for Virginia through breeding methods.

The objectives of the investigation are as follows:

- (1) To estimate the progress to be expected from mass selection as compared with family selection in the improvement of beef cattle.
- (2) To evaluate selection criteria and procedures and develop more precise and effective measures of quality and performance in beef cattle.
- (3) To simplify methods of progeny or sib testing whereby breeding cattle can be evaluated at comparatively young ages.

The long term breeding program for the work at Front Royal may be roughly sub-divided into five phases, each of which has some direct bearing on the main objectives stated above:

- (1) Test from weaning to yearling those bull calves which appear to be herd-sire prospects on the basis of their pre-weaning performance.
- (2) Progeny test as yearlings those bulls with favorable records from Phase 1.
- (3) Choose as foundation sires those bulls with good records from Phases 1 and 2. Obtain 32 daughters by each foundation sire and out of unrelated cows.
- (4) Allot 32 daughters from each foundation sire as follows: 16 are placed back with their sire to form an inbred line; 8 become part of a growth herd where selection emphasis is on growth; and 8 become part of a type herd where selection emphasis is on type. For each breeding plan, measure the progress in terms of changes in growth rate and conformation. Compare the actual results with those expected from theoretical considerations.

(5) Test inbred lines for combining ability and outcross performance.

III. PERSONNEL:

B. M. Priode, Superintendent, Beef Cattle Research Station, Front Royal, Va.
 K. P. Bovard, Associate Professor of Animal Husbandry, Virginia Polytechnic Institute, Beef Cattle Research Station, Front Royal, Virginia.
 R. C. Carter, Animal Geneticist, V.P.I., Blacksburg, Virginia
 C. M. Kincaid, U.S.D.A., ARS., Knoxville, Tennessee

IV. ACCOMPLISHMENTS DURING THE YEAR:

(1) The scope and nature of the project have remained essentially unchanged for several years. Calves from inbred lines are now relatively more highly inbred than in earlier years. Also, mild inbreeding (<10%) has occurred in the Angus and Shorthorn selection herds as a consequence of the finite sample size from which the bulls were chosen, and because of definite progress in the selection criteria, especially growth.

(2) Research Results.

- A. DDT in apple pomace - six yearling heifers were fed dried apple pomace known to contain 103 ppm. (parts per million) DDT. Samples of internal fat were taken from each animal before, during and following the apple pomace feeding period of 104 days. A ten-fold excess of the permissible legal tolerance (7ppm.) accumulated internally with no visible manifestation of toxicity to the cattle. Excess residues thus attained are slowly dissipated, average residues being 8.6 ppm. when the cattle were slaughtered 566 days after last receiving pomace.
- B. Artificial breeding results from 1959 and 1960 proved unsatisfactory. Calf crops were approximately 50% each year; per-service conception rate was 27%. Less difficulty was encountered with heat detection than generally reported by other research workers breeding beef cattle artificially. A slightly, but not significantly, smaller proportion of cows conceived following insemination when estrus was considered doubtful than those cows bred when believed to be in "standing" or definite heat.
- C. Leptospirosis experiment - project leaders approved a field trial study of experimental and commercial *Leptospira* vaccines to be conducted with cattle at this station. The work was initiated by Dr. D. F. Watson, VPI, with the Animal Disease and Parasite Research Division of the USDA cooperating. Seventy head of one and two-year-old females are being used in the study. A more complete report of the experimental design and results will be available later.
- D. In cooperation with American Scientific Laboratories, Inc., Madison, Wisconsin, a pinkeye vaccine developed by them was tested in 1960 on 450 Front Royal cows and 200 calves. All calves were treated; 1/3 of the cows received two doses of the experimental pinkeye vaccine, 1/3 received a single dose, and 1/3 received none. However,

there was no obvious outbreak of pinkeye in any of the calves nor among any of the cows, treated or untreated. Thus, the effectiveness of the pinkeye vaccine was essentially untested.

- E. Shrink effects - duplicate weights were obtained on each of 49 ROP bulls at 7 A.M. and again at 1 P.M. on March 8. However, water was not withheld overnight as was done February 22. Average weights at each time were:

<u>Treatment</u>	<u>Date</u>	<u>7 A.M.</u>	<u>1 P.M.</u>
Overnight shrink	2/22	804	830
No Shrink	3/8	857	864

The limited evidence available indicates that under these conditions bulls of this size would weigh approximately 19 lbs./head more (830-804 minus 864-857) when water was not withheld overnight. Analyses of the present data showed these results:

<u>Source</u>	<u>d.f.</u>	<u>Mean Squares</u>	
		<u>shrunk</u> <u>wts.</u>	<u>full</u> <u>wts.</u>
Times (7 A.M. vs. 1 P.M.)	1	33,935	2,373
Lots	3	551,262	545,936
TxL	3	958	164
Calves/Lots	45	17,318	19,022
TxC/Lots	45	75	100
Among duplicate wts.	98	3	2
Total		195	

- F. Numerator relationship charts have been completed for Angus and Shorthorn cattle produced on the station since 1949.

V. FUTURE PLANS:

- (1) Nearly all cattle will be pasture-bred in 1961.
- (2) Preliminary studies of the inheritance of mature size as defined by cow weights are planned.
- (3) Quantitative estimates of the effects of inbreeding upon conformation and growth rate are planned.

VI. PUBLICATIONS:

K. P. Bovard. Hereditary dwarfism in beef cattle. Animal Breeding Abstracts 28:223-237.

R. P. Lehman, J. A. Gaines, R. C. Carter, K. P. Bovard and C. M. Kincaid. Selection indexes for weanling traits in beef calves. J. Animal Sci. 20:53-57.

D. C. Meyerhoeffer, R. C. Carter, and B. M. Priode. Early selection of beef calves. J. Animal Sci. 19:1222-3 (Abstract).

J. C. Taylor, R. C. Carter, C. M. Kincaid, B. M. Priode, and J. A. Gaines. Estimates of genetic and phenotypic parameters in beef cattle. IV. Repeatability of cow performance. J. Animal Sci. 19:700-708.

J. W. Thornton, J. A. Gaines, and C. M. Kincaid. Estimates of parameters of growth in beef heifers. J. Animal Sci. 19:1228 (Abstract).

P. A. Putnam, K. P. Bovard and B. M. Priode. Volatile fatty acids in the rumen liquor of bulls on record of performance tests. Proc. North Atlantic Sec., Amer. Soc. of An. Prod.

VII. PUBLICATIONS PLANNED:

(1) "DDT residues in the internal fat of beef cattle fed contaminated apple pomace."

(2) "Effects of stage of estrus, and other factors, upon conception rate in beef cattle bred artificially."

PERFORMANCE OF COW HERDS. 1960 CALVES

Front Royal, Virginia Station

Line or group Breed of sire Breed of dam	1166 Angus Angus	57 Angus Angus	420 Angus Angus	890 Angus Angus	1349 Angus Angus	8184 Angus Angus	8044 Angus Angus
No cows calving	21	9	4	7	11	6	19
No. calves raised	17	9	1	4	8	6	17
Av. inbr. of calves (%)	.22	.28	.25	.25	.04	.07	.02
Av. birth date							
Av. birth wt. (lbs.) (1)	2/24 65	2/29 59	3/29 41	3/26 66	3/1 58	4/10 66	3/14 69
Av. weaning age (1)	234	223	191	186	230	192	205
Av. weaning wt. (2)	422	396	429	332	395	421	445
Av. weaning type score (1)	10.9	12.1	11.0	8.9	11.3	11.4	12.0
Av. weaning condition score (1)	9.4	10.3	9.6	7.3	10.0	9.3	10.2
Were calves creep fed?	No	No	No	No	No	No	No
Adjusted (3) av. daily gain from birth to weaning	1.99	1.88	2.06	1.47	1.88	1.97	2.09

FR VA (5)

(1) Results from bull and heifer calves were weighted equally to obtain the average values above for each line of breeding.

(2) Adjusted Average daily gain times 180 days plus birth weight.

(3) Adjusted for age of dam.

PERFORMANCE OF COW HERDS. 1960 CALVES

Front Royal, Virginia Station

Line or group Breed of sire Breed of dam	Unknown Angus Angus	322 Hereford Hereford	373 Hereford Hereford	8801 Hereford Hereford	8803 Hereford Hereford	361 Hereford Hereford	885 Shorthorn Shorthorn
No. cows calving	1	17	33	27	3	4	9
No. calves raised	1	17	30	26	3	4	7
Av. inbr. of calves (%)	-	-	-	-	-	-	.40
Av. birth date							
Av. birth wt. (lbs.)(1)	3/4 56	4/3 66	3/23 70	3/13 66	1/15 62	4/6 72	4/8 70
Av. weaning age(1)	200	191	201	216	277	188	154
Av. weaning wt.(2)	394	373	409	384	355	387	389
Av. weaning type score(1)	10.4	11.5	10.5	12.0	11.6	11.6	10.6
Av. weaning condition score(1)	9.3	9.0	9.2	9.8	9.7	10.0	8.4
Were calves creep fed?	No	No	No	No	No	No	No
Adjusted(3) av. daily gain from birth to weaning	1.88	1.71	1.88	1.77	1.63	1.76	1.78

(1) Results from bull and heifer calves were weighted equally to obtain the average values above for each line of breeding.

(2) Adjusted average daily gain time 180 days plus birth weight.

(3) Adjusted for age of dam.

PERFORMANCE OF COW HERDS. 1960 CALVES

Front Royal, Virginia Station

Line or group Breed of sire Breed of dam	1392 Shorthorn Shorthorn	287 Shorthorn Shorthorn	1114 Shorthorn Shorthorn	1143 Shorthorn Shorthorn	8848 Shorthorn Shorthorn	1463 Shorthorn Shorthorn	8158 Shorthorn Shorthorn
No. cows calving	10	2	10	7	2	2	6
No. calves raised	9	1	8	4	1	2	6
Av. inbr. of calves (%)	.30	.25	.20	.07	.0	.04	.06
Av. birth date							
Av. birth wt. (lbs.)(1)	3/23 71	3/13 66	2/28 72	3/13 68	3/3 73	1/18 69	4/11 73
Av. weaning age(1)	199	239	226	176	196	268	184
Av. weaning wt. (2)	413	360	380	399	415	401	423
Av. weaning type score(1)	12.6	11.9	12.0	11.5	11.2	10.7	11.6
Av. weaning condition score(1)	10.0	9.6	9.5	9.2	8.9	9.6	9.2
Were calves creep fed?	No	No	No	No	No	No	No
Adjusted(3) av. daily gain from birth to weaning	1.89	1.65	1.72	1.82	1.90	1.85	1.94

FR VA (7)

- (1) Results from bull and heifer calves were weighted equally to obtain the average values above for each line of breeding.
 (2) Adjusted average daily gain time 180 days plus birth weight.
 (3) Adjusted for age of dam.

PERFORMANCE OF COW HERDS. 1960 CALVES

Front Royal, Virginia Station

Line or group	Crossbred
Breed of sire	Various
Breed of dam	Various
No. cows calving	19
No. calves raised	19
Av. birth date	3/24
Av. birth wt. (lbs.)(1)	74
Av. weaning age(1)	205
Av. weaning wt.(2)	441
Av. weaning type score (1)	11.8
Av. weaning condition score(1)	10.1
Were calves creep fed?	No
Adjusted(3) av. daily gain from birth to weaning	2.04

- (1) Results from bull and heifer calves were weighted equally to obtain the average values above for each line of breeding.
- (2) Adjusted average daily gain times 180 days plus birth weight.
- (3) Adjusted for age of dam.

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
(or pastured for high gains)

Front Royal, Virginia Station

Line or group	Sta. Lines	Purchased	Sta. Lines	Purchased
Breed of sire	Angus	Angus	Hereford	Hereford
Breed of dam	Angus	Angus	Hereford	Hereford
<hr/>				
BULLS, No	12	5	9	1
Av. initial age (days)	215	262	225	166
Av. initial wt. (lbs.)	447	671	466	422
Av. no. days on feed	168	168	168	168
Av. final weight	812	1059	833	866
Av. daily gain	2.18	2.31	2.18	2.64
Av. score				
Conformation	10.5	11.4	11.3	9.4
Av. feed per day	20.01	25.61	19.36	-
Feeding regime	- - - - - Self Fed - - Ad lib - - - - -			
<hr/>				
STEERS, No.	16		12	
Av. initial age (days)	217		208	
Av. initial wt. (lbs.)	401		384	
Av. no. days on feed	249		249	
Av. final weight	815		885	
Av. daily gain	1.66		2.01	
Av. score				
Conformation	10.7		10.7	
Feeding regime	- - - - - Self Fed - - Ad lib - - - - -			
<hr/>				
HEIFERS, No.	28		25	
Av. initial age (days)	219		220	
Av. initial wt. (lbs.)	351		366	
Av. no. days on feed	168		168	
Av. final weight	570		592	
Av. daily gain	1.30		1.34	
Av. score				
Conformation	10.8		10.9	
Feeding regime	- - - - - Self Fed - - Ad lib - - - - -			

POSTWEANING PERFORMANCE OF CALVES BORN IN 1959 AND FULL FED AFTER WEANING
(or pastured for high gains)

Front Royal, Virginia Station

Line or group	Sta. Line	Purchased
Breed of sire	Shorthorn	Shorthorn
Breed of dam	Shorthorn	Shorthorn
<hr/>		
BULLS, No.	9	4
Av. initial age (days)	227	239
Av. initial wt. (lbs.)	445	583
Av. no. days on feed	168	168
Av. final weight	820	924
Av. daily gain	2.21	2.03
Av. score		
Conformation	10.4	12.6
Av. feed per day	20.80	20.70
Feeding regime	- - - Self Fed - Ad lib - - -	
<hr/>		
STEERS, No.	18	
Av. initial age (days)	221	
Av. initial wt. (lbs.)	352	
Av. no. days on feed	249	
Av. final weight	806	
Av. daily gain	1.80	
Av. score		
Conformation	10.5	
Feeding regime	Group Fed - Ad lib	
<hr/>		
HEIFERS, No.	37	
Av. initial age (days)	284	
Av. initial wt. (lbs.)	364	
Av. no. days on feed	168	
Av. final weight	630	
Av. daily gain	1.58	
Av. score		
Conformation	10.8	
Feeding regime	Group Fed - Limited Grain	

West Virginia University

I. PROJECT: Hatch 90 (S-10)

Reproduction Efficiency of Beef Cattle

II. OBJECTIVES:

- A. To determine the practicability and effects of breeding beef cows at first heat following parturition.
- B. To determine the incidence of ovulatory anomalies in beef cattle and their effects on reproductive performance.
- C. To compare the reproductive efficiency of two breeds of beef cattle when managed under like conditions.

III. PERSONNEL:

H. E. Kidder and G. C. Anderson

IV. ACCOMPLISHMENT DURING THE YEAR

Data has been collected on approximately 50 additional service periods during the past year. The data from the five years of the experiment are now ready for analysis. Analysis of the various components of the service period of the data collected for the first four years has shown that failure to come into estrus contributes the most to the length of service period. Analysis of the effects of the side of pregnancy (whether the pregnancy occurs in the right or left horn) on length of gestation and weight of the calf is underway. The possible difference between Angus and Herefords on length of gestation and the effects of the length of the interval from calving to first breeding on subsequent conception is under study.

V. FUTURE PLANS:

The collection of data has been completed. It is now undergoing analysis for possible publication during the coming year.

* * * * *

I. PROJECT: C. E. 118

The Effects of Two Systems of Selection of Breeding Stock on Beef Cattle Performance.

II. OBJECTIVES:

This project is an attempt to apply a selection index procedure to a commercial beef cattle enterprise and evaluate its effectiveness in terms of both theoretical gains expected and actual gain as compared to a non-selected population.

III. RESEARCH RESULTS:

- A. The grade Hereford herd, Reymann Memorial Farms, Wardensville, West Virginia, which consists of 100 breeding age females is on this experiment. The animals are divided into two groups A and B. The essential mechanics of selection in A groups are:
1. The necessary number of female replacements are drawn at random from the normal healthy calves born each year.
 2. The necessary number of males are drawn at random from the normal healthy bull calves born each year.
 3. Females of breeding age, other than those lost through death, failure to conceive, or other diseases are discarded at random.
- B. In group B females and males are raised and selected on the basis of an indexing procedure based on weaning weight and weaning scores.
- C. The 1961 herd will be handled in the same manner as they have been in the past. The heifers from the 1959 calf crop were added to the respective herd for which they had been originally saved. The bulls, saved in 1959, are being used as herd sires. The herd is now at maximum size and it estimated that as many as 10 females in each herd can be culled this fall.

PERFORMANCE OF COW HERDS. 1960 CALVES

West Virginia Station

Location Breed of sire Breed of dam	Morgantown Hereford Hereford	Morgantown Angus Angus
No. cows calving	50	42
No. calves raised	42	29
Av. inbr. of dams (%)	0%	0%
Av. inbr. of calves (%)	0%	0%
Av. birth date	* year round	
Av. birth wt. (lbs.)	63.6	55.7
Av. weaning age	241	219.5
Av. weaning wt.	359	370
Av. weaning type score	10.8	11.6
Were calves creep fed?	No	No
Av. daily gain from birth to weaning.	1.22	1.43

